THE AMERICAN GAS-LIGHT JOURNAL AND CHEMICAL REPERTORY

Publishing Office, No. 42 Pine Street.

Devoted to the Interests of Illumination, Heating, Ventilation and Sanitary Improvement, Domestic Economy, and General Science.

VOLUME XVI.—No. 7.
WHOLE No. 294.

NEW YORK, TUESDAY, APRIL 2, 1872.

$3 PER ANNUM IN ADVANCE.

Improved Patent Pipe Joint.

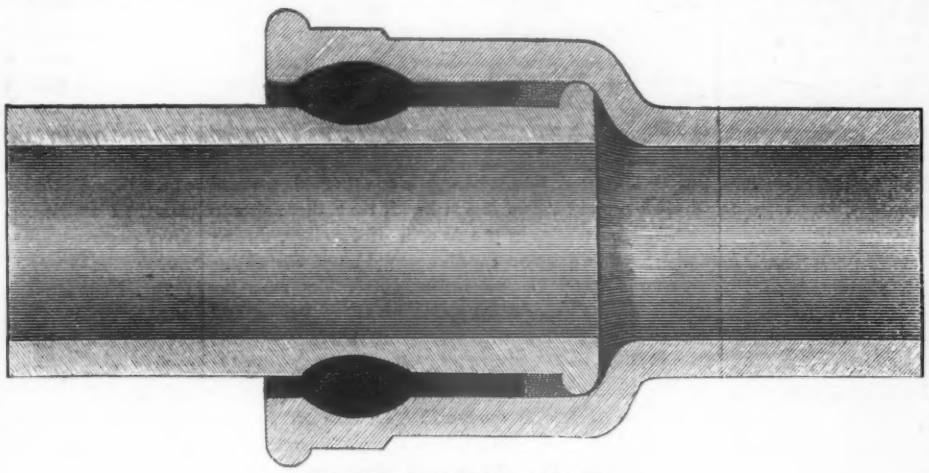
The improved pipe-joint for cast iron pipes herewith presented, is too simple and its advantages too apparent to require much explanation, as these will be seen at a glance by every practical engineer.

The improvement consists simply of a groove cast in the bell or socket of the pipe, with a similar groove on the spigot end of the pipe, so that when the space thus formed is fixed with lead and caulked as usual, it becomes impossible for the joint, from any cause whatever, to pull apart and cause leakage.

The engraving represents a longitudinal section of the bell or socket end of an iron pipe, with the spigot end inserted therein in position to receive the lead.

The black shaded part shows the grooves as cast in the bell and spigot ends of the pipe, thus forming an enlarged space for the lead, which, when cast and caulked, effectually prevents leakage from the expansion and contraction of the pipes, resulting from changes in the temperature.

A patent for this improvement was granted on February 20th, 1872; to S. Trumbore and B. E. Lehman, of Bethelehem, Pa. Any parties desiring further information on this subject are requested to address, B. E. Lehman, Bethelehem, Pa. Liberal arrangements will be made with any parties for the purpose of introducing this improvement.



PATENT PIPE JOINT.

River Water.

The worthy burghers of Albany city do not particularly relish the prospect of being obliged to drink the water of the Hudson, although chemical analyses are plenty to prove its superiority over all other beverages. Nor are they to be blamed for their repugnance if the water of our mighty river contains but half the impurities found in a neighboring stream, the Connecticut. A citizen of Hartford sends a few facts recorded at a time when the people of that city derived from it their water supply. He says: "When we were supplied with water from the Connecticut River, there were many days during the year that the water was very roily and gritty owing to freshets. Many service pipes were clogged with fish (eels) very much more so than at present." As most housewives prefer to select their fish themselves at the market, the fact that they were thus enabled to find them "at home" was not in strong argument in favor of the water. But the writer has some further advantages to enumerate. "Frequently when hydrants were flushed out, a stream of mud and filth pumped from the Connecticut river would discharge in solid column forty feet long, followed by plenty of dead fish. Small fish by the million—pickerel and suckers—would enter the screen at the water works, pass through the pumps into the reservoir, where their growth was rapid, and soon the pickerel would begin to feed on the sucker family, and cartloads of dead suckers could be seen on the sloping banks of the reservoir."

"The water-shed of the Connecticut river," says the same correspondent, "is to the extent of nine-tenths used for cow and sheep pastures. On the banks of the river and its tributaries are located many factories, bleacheries, tanneries, slaughter-houses, etc., which are continually discharging their filth into the river, and floating it down to our water-works to be pumped up for supplying the city. Besides, dead horses, cows, sheep, hogs—in fact all sorts of dead bodies, both animal and human—come floating down the river. Many lodge against the supply pipe screen at the water works, and by the action of the pumps, sucking them against each other and the screen, their carcases soon lose their flesh, to be pumped up in the reservoir for distribution to service-pipes, where all families can draw the stuff for culinary purposes. This was the condition of the Connecticut River water once supplied to our city"! and Albany does not rejoice at the prospect. In the face of such facts, no quantity of chemical analyses can induce the Albanians to cry eagerly for "Hudson water." The possibility of a failure in our own water supply should lead to some means of permanent relief, or we may be driven to sources equally bad. Must our cry be:

"Water, water everywhere,
And not a drop to drink."

—*Evening Post.*

Restoring Charred Manuscript.

The wholesale destruction by the fire in Chicago of the receptacles used for the safe keeping of valuable written and printed documents, has called for some means of restoring burnt manuscript and the like, at least so far as to permit the same to be deciphered. A resident, Mr. J. V. L. Blaney, of the burned city, has attempted to meet the necessity by a patented process, which he describes as follows:

"The charred paper is to be first separated into single leaves, and then immersed in a solution of a soluble compound of silver or copper for such a time as may be required to render the printing or writing sufficiently legible. A solution of the nitrate of silver containing forty grains of that salt to one fluid ounce of distilled water is preferred. If the restoration is only required to be made on one side of the sheet, the solution may be applied with a brush, or by floating the paper upon the surface of the liquid.

"The process succeeds best in a dark or a feebly lighted room. After sufficient legibility has been attained, the paper should be soaked for some time in pure water to remove the excess of the salt used—in the case of silver salts, a dilute solution of hyposulphite of soda or of cyanide of potassium may be used—after which the paper may be exposed to the light, and when dry, covered with a transparent mucilage or varnish, for preservation."—*Am. Artisan.*

[A case has recently occurred in this city to which the above might not have been without applicability. We refer to the destruction of the "vouchers" in the City Hall. It is said that attempts were made unsuccessfully under the direction of an expert in this city of *large* popular reputation, to decipher the remains of these documents.—Ed.]

New Jersey Gas Legislation.—At the present session of the New Jersey Legislature, a bill has been introduced concerning gas companies in Hudson county forbidding, under a penalty of $100 for each offense, the taking off the pressure, the adulteration of gas with common air, the charging for meters, or the cutting off the gas supply for non-payment.

There are said to be very valuable oil lands in Tennessee, which for development await the opening of railroads, some of which are now building.

Chemical Repertory,
No. 65.— April 2, 1872.
EDITOR—HENRY WURTZ.

CHEMICAL EXCERPTS.

199. Wonders Will Never Cease.—Geologists must hide their diminished heads, and "sing small" at least. Their cherished theories are *now* completely subverted. We shall merely state the "fact." Comment is superfluous—

A four pound cannon-ball was recently found in a lump of coal taken from a depth of 150 feet below the surface of the earth, at the Anglia Coal Mine, Maccan, N. S.—*Coal Trade Circular.*

The questions naturally arise, what was that cannon-ball fired at, and what was it fired from?

Anent the foundations for the East River Bridge, the New York *Times* also says:

"At last, at a depth of 80½ feet, the firm "bed rock" was reached, that submarine spur of the Catskill Mountains upon which the Island of Manhattan is seated. And at this depth will eventually rest the New York tower."

That the New York Island schists belong to the Catskill group, *is* good. How these talented attaches of the "great moral engine" do shame us. How they jump at solutions of the mysteries that so exercise the plodders in Science. "It is as easy as lying."

200. Preservation of Vegetables.—A western paper gives the following recipe for keeping potatoes, and asserts that it will preserve them for years: Dust over the floor of the bin with lime; put in about six or seven inches deep of potatoes, and dust with lime as before. Put in six or seven inches of potatoes, and lime again, and repeat the operation till all are stowed away. One bushel of lime will do for forty bushels of potatoes, though more will not hurt them, the lime rather improving the flavor than otherwise. The lime may be used for fertilizing after this use of it.—*Scientific American.*

[If this be authentic, it is not only important, but gives rise to interesting questions. As powdered, doubtless slacked, lime is prescribed, mere desiccation cannot be the agency of preservation. The large amount of water in the potatoes is against this also.

Is the absorption of *carbonic acid* by the lime the cause? This acid has had a high reputation as an antiseptic. Or are there other acids, of volatile nature, produced in the incipient stages of vegetable decay or germination, and necessary to the continuance thereof, which are removed by the lime? Is there any connection with the alleged preservation of eggs by packing in lime or even washing with lime-water? Would other vegetables be found amenable to the same treatment? Would it not do simply to sprinkle the potatoes with lime-water and then dry them before storing? The track should be followed up.—Ed.]

201. [Suggestions for Gas Analysis.—There is sorely needed some better and direct mode of separating carbonic oxide and marsh gas in coal gas. While exercised on this question, the following paragraph was encountered:]

F. Ludwig has published, in the *Wiener Anzeiger* some researches on the action of chromic acid on certain common gases, namely, carbonic oxide, hydrogen, marsh gas, and olefiant gas. Even at ordinary temperatures, and in contact with dilute as well as with concentrated solutions, carbonic oxide is transformed into carbonic acid. Hydrogen gas, on the other hand, is oxidized with tolerable rapidity by concentrated solutions. At common temperatures, marsh gas is unattacked. Olefiant gas is oxidized to formic and possibly to acetic acid, as well as to carbonic acid and water at ordinary temperature. Operating at higher temperatures, Chapman and Thorp found only carbonic acid and water.

[It looks as if a method were here indicated of determining carbonic oxide in coal gas. If after the carbonic acid, olefiant etc., have been absorbed by potash and sulphuric acid, we can then in the cold oxidize by chromic acid the carbonic oxide without affecting the marsh gas, the carbonic acid thus formed will be easily determined by potash absorption. An early occasion will be taken to test the idea.—Ed.]

202. How Easily Butter is Spoiled.—A farmer's wife writes: "Of all the products of the farm, butter is most liable to be tainted by noxious odors floating in the atmosphere. Our people laid some veal in the cellar, from which a little blood flowed out, and was neglected until it had commenced smelling offensively. The result was, that a jar of butter which I was then packing smelled and tasted like spoiled beef. Another lady reader observes that there was a pond of filthy, stagnant water a few hundred feet from the house, from which an offensive effluvium would be borne on the breeze directly to the milk room, when the wind was in a certain direction, the result of which was that cream and butter would taste like the disagreeable odor coming from that pond. As soon as the pond was drained, we had no more damaged butter."—*Jour. of the Farm.*

[The almost immediate ruin of butter when put into a refrigerator or ice box not scrupulously clean, or containing almost *any* odorous material, is familiar. For ten years or more we have inculcated and applied in our own family, in summer, when this is frequently unavoidable, that the butter be covered with a layer (one inch is sufficient) of clear saturated brine. This is impervious to all such effluvia, and will even extract a slight superficial taint from the butter when previously incurred.—Ed.]

203. Iron Versus Wood.—The two new iron ferry-boats, Fulton and Farragut, recently placed on the Fulton Ferry, were so badly damaged by the ice, a few weeks ago, that they have been laid up for repairs. It is said that the boats were built of iron with an idea that this material would stand the buffets of the ice-floes better than wood; but it appears the ice stove in the sides and started the rivets at one, and in the other knocked a large hole just on the water line. The boats which replaced them are of wood.

204. Postponed on Account of the Weather.—The more ignorant followers of Holy Mother Church in Philadelphia have been undergoing paroxysms of terror, on account of a prophecy made in Rome in the beginning of this century by a venerable servant of God, named Anna Maria Yaigi, that there should be three dark days in the month of January, during which neither gas nor candles would be of the slightest effect unless blessed beforehand. The rush for consecrated dips was so great in consequence, and the excitement so wide-spread that Bishop Wood found it necessary to issue a circular letter to calm his flock. As the prophecy assured us that the darkness would extend all over the world, we do not see why the Philadelphians wanted to make it a provincial affair, unless they had especial doubts as to the quality of their gas as made for them by the municipality.

205. Influence of the Variation of Temperature upon the Mode of Decomposition of Explosive Compounds.—Dr. Jungfleisch.—Alluding to Prof. Abel's explanation respecting some of the phenomena of the explosion of detonating compounds, the author states that from his experiments on this subject he is inclined to infer that the phenomena are due to the degree of temperature to which the substances are submitted. This opinion is also shared by Drs. Berthelot and Maumene, who brought the following instances in support of their views:

When nitrate of ammonia is suddenly heated it yields, in addition to water and protoxide of nitrogen, also binoxide of nitrogen and nitrous acid; while, when upon nitrate of potassa kept fused at 337° a piece of the charcoal is placed, it remains black, deutoxide of nitrogen being evolved; but a slight increase of temperature produces a sudden decomposition attended with deflagration.—*Academy of Sciences.*

206. Preparation of Alizarine.—Messrs. Bronner & Grutzkow, of Frankfort, have proposed a mode of preparing alizarine, which has been favorably received and introduced into several large chemical works in Germany. It consists essentially of three operations, as follows:

Anthracene is obtained by the distillation of asphaltum with superheated steam; this is rectified by redistillation Anthracene heated with double its weight of nitric acid, of 1·3 to 1·5 specific gravity, and washed, gives *anthrachinone.* This is dissolved in moderately warm sulphuric acid, and nitrate of protoxide of mercury added. The solution of this compound in an alkali is filtered, and precipitated by means of an acid. The precipitate contains variable quantities of alizarine and purpurine.

207. On the Solubility of Bisulphide of Carbon in Alcohol.—C. Tuchschmidt and O. Follenius.—Only absolute alcohol can be mixed with bisulphide of carbon in every proportion; in the case of dilute alcohol a point of saturation is reached, which is more rapid as the alcohol is more dilute. This relation is made use of, to determine the amount of water in alcohol.—*Am. Chemist.*

208. Preparation of Absolute Alcohol.—E. Erlenmeyer.—After briefly referring to the difficulty and loss of time experienced in the preparation of absolute alcohol by the aid of such substances as carbonate of potassa, anhydrous sulphate of copper, dried ferrocyanide of potassium, caustic potassa, caustic baryta, etc., the author states that, after all, caustic lime, is the best, and, indeed, as proved by Dr. Mendelejeff (*Zeitschrift fur Chemie*, 1865, p. 260), the only, substance which will answer the purpose of rendering alcohol anhydrous. The author has somewhat modified Mendelejeff's method by causing the alcohol (of course very strong, and containing already less than 5 per cent. of water) intended to be made absolute to boil along with the caustic lime for about one hour, the apparatus being so arranged that any condensed alcohol flows back into the retort. After the lapse of the time alluded to, the distillation is proceeded with, the result being that the distillate (several litres by bulk) is all obtained in anhydrous state. With an alcohol containing more than five per cent. of water this same operation has to be repeated several times.—*Chemical News.*

[Why this mode of dehydrating alcohol should be imputed to the eminent chemist Meudelejeff, we know not. It is certain that one of the earliest experiments in chemistry of the present writer was the preparation of anhydrous alcohol in 1848 in the laboratory of Dr. John Torrey, then Professor at Princeton, by this method. Quick lime was slaked by digestion in the body of a still with commercial alcohol for 24 hocrs. Heat was then applied. The distillate, however, was distinctly contaminated with acetone.—H, W.]

209. New Reagent for Alcohol.—M. Berthelot.—This depends on the fact that benzoic chloride ($C_{14}H_5ClO_2$), in the presence of water is decomposed at best very slowly, even when warmed; but if alcohol exists in the water, benzoic ether is formed, which may be readily recognized by heating a drop or two of the solution with an aqueous solution of potassa, when the odor of benzoic acid may be readily recognized.

210. Artificial Alizarine.—Among the patents taken out for the production of artificial alizarine from anthracene—the coal tar product; is one by R. S. Dale and C. Schorlemmer as follows:

One part of anthracene is boiled with four to ten parts of concentrated sulphuric acid and largely diluted with water, and the solution neutralized with carbonate of baryta, soda or potash, and the resulting sulphates removed by filtration or crystallization. The resulting liquid is digested with caustic soda or caustic potash, and a quantity of nitrate or chlorate of potash, equal to the original anthracene, as long as a blue violet color is produced. Out of this product the alizarine is obtained by precipitation with an acid.—*Jour. of Applied Chem.*

211. Temperature at which Detonating Compounds Explode.—L. Leygue and M. Champion.—From a tabulated form appended to this paper, and exhibiting some of the results of experiments made by the authors, we learn that fulminate of mercuy becomes ignited and detonates at 200°; gun-cotton, at 220°; sporting powder, at 288°; gunpowder used for heavy ordnance, at 295°; the picrates of lead, iron, and mercury, all at 296°; nitro-glycerine, at from 256 to 257 degrees; sulphur ignites in air at 246°: the powder (fulminate) contained in the caps of the Chassepot rifles, at 191°.—*Acad. of Sciences.*

212. Reducing Action of the Hydrogen Absorb-

ED BY PALLADIUM.—Dr. H. Kolbe.—The contents of this paper record a few experiments, from which it appears that the hydrogen absorbed by palladium has the property of converting nitro-benzole into aniline when the vapors of the former are passed along with hydrogen gas over spongy palladium; chlor-benzoyle is converted, under similar conditions, into benzoic-acid-aldehyde and benzyl-alcohol; with spongy platinum this does not occur.—*Chem. News.*

213. BLEACHING SPONGES.—The sponges to be bleached are placed in dilute muriatic acid, (four quarts common acid to six quarts water), until bubbles of carbonic acid cease to be given off. They are then put in clean water, squeezed out several times, and the water renewed from time to time. The sponges are now placed in a bath consisting of 2 lbs. hyposulphite soda, 12 lbs. water and 2 lbs. muriatic acid. The vessel is carefully closed to prevent the escape of sulphurous acid gas into the air, the sponges left in for two days, and again rinsed out. If they are not yet white enough, they are put in another bath, consisting of 4 lbs. hyposulphite soda, 12 lbs. water and 2 lbs. muriatic acid. In place of the hyposulphite soda (antichlor.), bisulphite of soda may be used with great advantage. The manner of using the latter is the same as with antichlor.—*Jour. of Applied Chemistry.*

214. CONSUMPTION OF SMOKE.—At the November meeting of the Scientific and Mechanical Society of Manchester, England, the discussion turned on smoke consuming furnaces. After a thoroughly scientific *expose* of the generally accepted theory of smoke consumption, and of the thousand and one inventions, self-acting and otherwise, that have been applied for this purpose, the practical experience of the members was brought to bear upon it. Self-acting apparatus was voted to be of no practical use whatever. The system of admitting air behind the bridge found a few supporters, but after being brought to the test of experience, even with all its appliances of hollow fire-bars and perforated bridge, its advantages were found to be very doubtful. The opinion of the majority of the members was, that a short dead plate, with perforated fire-door, and an efficient stoker, is the best smoke- consuming apparatus extant, when coupled with plenty of boiler-power, to avoid forcing the fires. —*Am. Artisan.*

215. DETERMINATION OF NITROUS AND NITRIC ACIDS IN RAIN WATER.—By M. Chabrier.—Rain water, at least in the first months of the year, has been found by this author to contain 0·7 to 0·8 milligrammes of nitrous acid, and from 0·30 to 0·35 milligrams of ammonia in a litre. From this the author calculates that a hectare of ground to a depth of 30 centimeters receives annually 3·75 kilogrammes of nitrous acid, corresponding to 5·45 kilogrammes of nitrite of ammonia.

[The last three numbers given are equivalent, in English weights and measures, to 3·31 lbs. of avoirdupois of nitrous acid and 4·81 lbs. of nitrite of ammonia, per acre, to a depth of 11.8 inches.—ED.]

216. APPATATUS FOR THE DETERMINATION OF THE FUSING POINT OF ORGANIC SUBSTANCES.–Julius Loewe. —The electric current of a weak element is interrupted by a platinum wire coated with the substance whose fusing point is to be determined. As soon as fusion takes place, the current finds its way to an alarm signal and indicates the point at which the substance fuses.—*Dingler.*

217. ON THE EXTRACTION OF ANIMAL FATS, TO BE USED AS FOOD OR FOR COSMETICS.—H. Vohl.—The raw fat is put into a stone or earthen vessel, covered with a perforated disk, 10 per cent. dilute pure hydrochloric acid of sp. gr. to 100 lbs. of water) added and heated in a water-bath. The fat is washed with hot water, finally with some carbonate of magnesia, dissolved in naphtha and the clear solution distilled.—*Ibid.*

218. SEPARATING ANIMAL AND VEGETABLE FIBRE. —The process of Jules Person for recognizing the presence of silk in mixed tissues, consists in the use of a concentrated solution of basic zinc chloride, which dissolves the silk, without affecting the other textile fibres. It is becoming very generally employed, being used to decide upon the admissability of certain mixed tissues into French ports. The reagent is easily prepared, thus: A solution of zinc chloride is boiled with zinc oxide in excess, so as to obtain a fully saturated solution. This is filtered and evaporated to a density of 60° B. This liquid possesses, at the boiling point, the property of dissolving silk in considerable quantity and very rapidly (in 50 or 60 seconds only). It may be used a great number of times, and permits the silk to be detected in a thread or a mixed tissue even in the presence of all the animal and vegetable fibers. After treatment, the sample is washed with water acidulated with HCl, then with pure water, after which it may be dried and weighed.—*American Chemist.*

[In 1862, the Editor of this Journal succeeded well, in the laboratory of Dr. John Torrey, by the method of Person, *then* new, in some experiments to remove, without injury to the note, the so-called "spider tracks," or dyed fibres of silk interwoven into the texture of the paper of some of the earlier fractional currency notes (with a view to prevent counterfeiting by photography). The plan was at that time abandoned, but it would appear to have been returned to now, in the latest new issues of this currency.—ED.]

The West Bloomfield Gas Well.

Prof. S. A. Lattimore, of Rochester University, has recently made a careful photometric test of the illuminating power of the gas of the West Bloomfield well, and found it to be 14·42 candles. He estimates the flow of the well to be 800,000 feet per 24 hours. The main to convey the gas to Rochester is being rapidly laid down, and it is thought that the city will, before long, derive all its light from this well. Who knows but gas wells are to play a more important part in the world than oil wells?—*Exchange.*

GREAT INCREASE IN THE FLOW OF GAS FROM THE WELL—CONSIDERABLE EXCITEMENT OVER IT.

We have already stated that a month or more since, the gas from the Bloomfield natural well commenced flowing into the receivers of the Rochester Gas Company in this city—that the flow was small— a few thousand feet per day, much to the disappointment of those who were interested in the project. The officers of the Bloomfield Company at once saw that their pipes were obstructed and until the obstructions were removed their project must remain inexpedient. The pipes had been laid in an open ditch into which water had fallen and the consequence was that the pipes became clogged with ice, and they settled in places even below the "drips" that had been put in at intervals. To remove the ice and level up the pipes has been the work of the company for weeks, but the work has been slow on account of the weather, and the ground being frozen to such great depth.

The gas which had flowed into the receivers had been mixed by the company with their manufactured gas and distributed through the pipes to customers on the east side of the river, who, we venture to say, have remained in entire ignorance of the fact that they have in part been using Bloomfield gas.

Yesterday an important obstruction was found by the Bloomfield Company between this city and the well. It was a piece of wood which nearly checked the flow. It was removed and immediately the gas commenced flowing into the receivers in the city at the rate of nearly 100,000 cubic feet in twenty-four hours. This discovery was hailed with great joy by the Bloomfield Company. They were doomed to disappointment, for the Rochester Gas Company yesterday informed them that they would not receive any more gas from them—that what they had received and mixed with their own manufacture had so deteriorated the quality that customers had complained bitterly.

The Bloomfield Company now propose, we understand, to ask permission from the Common Council, to erect gasometers and lay their pipes in the streets of the city, promising to furnish gas at the rate of two dollars per thousand cubic feet. The company are now satisfied that as soon as the weather moderates, and they can get at their pipes, they can supply daily from three hundred thousand to four hundred thousand cubic feet of gas—and that the gas shall be in quality equal to the best manufactured by the Rochester Gas Company. Further developments will be awaited with interest by our citizens.—Rochester *Union*, March 15.

Pittsburgh and Allegheny City Gas Inspection.

Roland H. Smith, Esq., Inspector of Gas and Gas Meters in Pittsburgh, says: "The gas furnished by the Pittsburgh Gas Company I have found to have had an illuminating value of from seventeen to nineteen candles, and free from all impurities; the tests made for this company were upon a photometer in my office, located at least two miles from their gas works.

"The gas of the Alleghany Gas Company has shown an illuminating value of from sixteen to eighteen candles, and free from all impurities, except slight traces of ammonia, which seems to exist in larger quantities in the coal which they use; they have made every endeavor to get rid of this impurity, but have not yet entirely succeeded, although they have very considerably improved since my last report, and will, I think, eventually succeed, as the various pipes of their works must have been coated with large deposits of this impurity. The tests for this company were made at their office, located at least one and a half miles from their works.

A Lecture on Water.

By CHARLES F. CHANDLER, PH. D.

At the Academy of Music, New York, Jan. 20, 1871.

[Reported stenographically by S. J. Borrows, Esq.]

[Abstract by the Editor of this Journal.]

[Concluded from page 84.]

THE CROTON WATER.

Few cities are more fortunate in the quantity and quality of their water supply than are New York and Brooklyn. The Croton water is brought to the city of New York by an aqueduct forty-five miles long, which was completed in 1842, the water having been admitted on the 4th of July of that year. Where the water enters the aqueduct, a dam 230 feet wide and forty-five feet high was erected in the Croton river, by which the Croton lake was formed. This serves as a great reservoir or sedimentary basin. The average quantity of water supplied to the citizens of New York is 65,000,000 gallons daily. Eighty or ninety million gallons could be supplied were none allowed to flow over the dam. Mr. Jarvis, the engineer, gauged the river at its lowest period, and found its minimum flow to be thirty-two million gallons daily. In long continued dry weather, a deficiency of water occurs, for the simple reason that there is not at present sufficient storage capacity in the reservoirs. The capacity of the reservoirs is shown on the diagram:

	Gallons.
Fifth avenue reservoir.....	20,000,000
The old reservoir in the Central park...	38,000,000
The new reservoir in the Central park	1,000,000,000
Total.....	1,058,000,000

Equivalent to sixteen days supply.

Mr. Craven, chief engineer of the Croton department, carefully examined the region drained by the Croton and its branches, and found several points at which, by the erection of dams of moderate dimensions, enormous storage reservoirs could be formed. The aggregate capacity of the fifteen reservoirs which he indicated as practicable amounted to 67,600,000,000 gallons, or three years supply for the city of New York! It may be asked does a sufficient quantity of water fall in the region to fill such a series of reservoirs? I answer that the average rain-fall is somewhere in the neighborhood of fifty inches, or about thirty-one gallons on every square foot, or nearly a thousand million gallons to the square mile.

The area which is drained by the Croton river and its tributaries, or, in other words, the Croton watershed, measures 338.82 square miles, with an elevation of from 250 to 600 feet above the sea level. One of the reservoirs, planned by Mr. Craven, has been nearly completed, at Boyd's corner, in Putnam county, by Gen. George S. Green. The dam is placed across the west branch of the Croton, twenty-three and three-quarter miles from the Croton dam; it is 650 feet long and sixty-four feet high, and the reservoir, when com-

pleted, will cover an area of 303 acres. It will hold 3,369,000,000 gallons of water, a quantity sufficient to supply the city fifty-five days, with its present population. This reservoir alone will carry the city through the longest drouth which is liable to occur. As the population of the city increases, it will merely be necessary to construct a new reservoir from time to time. The present supply of water is very liberal, amounting to sixty-five gallons per head daily. Imperial Rome received, however, from 300 to 340 gallons per head daily.

Few cities at the present day are as liberally provided as New York, the supply of

	Gallons.
Manchester, in 1852, was	50
Liverpool, " 1862, "	30
Edinburgh, " 1852, "	30
Glasgow, " 1862, "	50
London, " 1862, "	50
New York, " 1870, "	65
Imperial Rome	300 to 340

It has been frequently proposed of late to place water meters in every building in the city, and tax the citizens in proportion to the quantities of water actually drawn through them. This measure, it is claimed, will prevent the present waste of water. There is an air of justice, too, in the proposition to charge the consumers for the water actually used. Persons may be wasteful if they choose, but they must pay for the privilege.

In my opinion, however, this proposition cannot be too strongly condemned. Pure water is hardly second to pure air as a life-giving and life protecting agent. It is the most potent servant the sanitary authorities can call to their aid. To measure out and sell, by the gallon, this bountiful gift of the Creator would be a crime against the people. It would be in direct opposition to the current of modern civilization, only to be compared, though really a much more serious act, to the tax on windows, which, not a great while ago, compelled people to exclude the blessed light of day from their dwellings, and led architects to adapt their style of architecture to the obnoxious law.

We have already seen that the water-shed of the Croton, with its 339 square miles of area, is capable of supplying water for a city of 5,000,000 of people, and that the erection of a few dams will secure reservoirs capable of storing this supply. Let the money then that would be spent in purchasing costly water meters, which are five times as expensive as gas meters, be spent in constructing one of these dams, to give us all the water we need. In truth, the reservoir at Boyd's corner, which can easily be completed within a year, will, alone, enable the Croton department to give us all the water we need. There is no earthly reason why our water supply should be limited, unless possibly for the benefit of the owner of some patent meter. I speak advisedly on this subject, having been over the ground, and seen the sources of supply with my own eyes. We should never consent to see the poor deprived of so essential a source of health and happiness, as pure and abundant water. On the contrary, there is no object for which the public funds can be more legitimately expended, than for increasing the facilities for using water, by the establishment of free public salt and fresh water baths. Why should we, of free America, in the nineteenth century, be behind Rome in the days of the Cæsars?

The importance of an abundant supply of pure water is now so fully appreciated in England, that the city of London is about to go to an enormous expense to obtain it. Two plans are under discussion; one involves bringing water from Wales, a distance of 220 miles, at a cost of £10,000,000; the other of bringing it 250 miles, from Cumberland, at a cost of £13,000,000. The purity of the Croton water is remarkable; if you glance at this diagram, you will see the quantities of the different substances obtained from one United States gallon of 231 cubic inches, in 1870:

Solids contained in one gallon of Croton water.

	Grains.
Soda	0.326
Potassa	0.097
Lime	0.988
Magnesia	0.524
Chlorine	0.243
Sulphuric acid	0.322
Silica	0.621
Alumina and oxyd of iron	a trace
Carbonic acid (calculated)	2.604
Water in bicarbonates (calculated)	0.532
Organic and volatile matter	0.670
Total	6.927
Less oxygen, equivalent to the chlorine	0.054
	6.873

These acids and bases are probably combined in the water as follows:

	Grains.
Chloride of sodium	0.402
Sulphate of potassa	0.179
Sulphate of soda	0.260
Sulphate of lime	0.158
Bicarbonate of lime ($CaO, HO.2CO_2$)	2.670
Bicarbonate of magnesia ($MgO,HO,2CO_2$	1.913
Silica	0.621
Alumina and oxyd of iron	a trace
Organic matter	0.670
Total	6.873

On evaporating a gallon of this water, a residue of only 4.78 grains is obtained, the bicarbonates of lime and magnesia being left as simple carbonates.

The following tabular statement shows how favorably the Croton compares with the waters supplied to other cities:

PURITY OF CITY WATERS.

Impurities contained in one wine gallon of 231 cubic inches, expressed in grains.

City.	SOURCE.	Inorganic matter.	Organic and vol. matter.	Total solids.
New York	Croton, average for 13 weeks, 1867 (C. F. Chandler)	3.90	0.66	4.56
New York	Croton, average for 3 months, 1868 (C. F. Chandler)	3.31	1.14	4.45
New York	Croton, average for 6 months, 1869 C. F. Chandler)	4.11	0.67	4.78
New York	Well west of Central park (C. F. Chandler)	38.95	4.55	43.50
Brooklyn	Ridgewood, average for 3 mos., 1869 (C. F. Chandler)	3.37	0.59	3.92
Boston	Cochituate (E. N. Horsford)	2.40	0.71	3.11
Philadelphia	Fairmount, Schuylkill (E. N. Horsford)	2.30	1.20	3.50
Philadelphia	Delaware (H. Wurtz)	2.93	0.55	3.48
Albany	Hydrant (E. N. Horsford)	8.47	2.31	10.78
Troy	Hydrant (W. Eldhorst)	6.09	1.34	7.43
Utica	Hydrant (C. F. Chandler)	5.50	0.96	6.46
Syracuse	New reservoir (C. F. Chandler)	12.13	1.80	13.93
Cleveland	Lake Erie (J. L. Cassels)	4.74	1.53	6.27
Chicago	Lake Michigan (J. V. Q. Blaney)	5.62	1.06	6.68
Rochester	Genesee river (C. F. Chandler)	12.02	1.23	13.25
Schenectady	State street well (C. F. Chandler)	46.88	2.33	49.21
Newark, Jersey City, Hoboken, Hudson City	Passaic river (E. N. Horsford)	4.58	2.86	7.44
Trenton	Delaware river (H. Wurtz)	2.93	0.55	3.48
London	Thames (Dr. H. Letheby)	15.55	0.83	16.38
London	Well, Leadenhall street (Dr. H. Letheby)	90.38	9.59	99.97
Dublin	Lough Vartry, new supply (Apjohn and others)	1.77	1.34	3.11
Paris	Seine, above the city (Bussey, Wurtz and Ville)	7.83	1.00	8.83
Amsterdam	River Vecht (V. Baumhauer and Van Moorsel)	14.45	2.13	16.58
Amsterdam	Deep well at the Keisersgracht	64.55	4.38	68.93

You see by this table that the Croton compares very favorably in purity with the water supplied to other cities. I will call your attention specially to the fourth water on the list, that of the well west of Central park. This water, you see, contains forty-three and one-half grains of impurities in one gallon, of which over four and one-half grains are organic matter. You will not be surprised when I tell you that this well is situated in a shanty village, where cholera was a few years ago extremely fatal.

No one who has ever examined the district of 338 square miles which supplies the Croton river, will be surprised at the purity of the water as shown by analysis. Mountains and hills of Laurentian gneiss receive the rain fall, which is quickly absorbed and filtered by the pure siliceous sands and gravels, to gush out in numberless springs, feeding the brooks which bear the sparkling waters to the ponds, which serve as natural storage reservoirs. From these flow the large streams, which, by uniting, form the Croton river. This is finally expanded, by the dam at the head of the aqueduct, into a broad deep lake, the *fountain reservoir or Croton lake*, in which the quiet waters deposit the finer sediments, and thus undergo a final purification before they are admitted to the aqueduct.

Nowhere along the streams can anything be found which can render the waters impure. Rugged rocks or bright green pastures generally border them. A few factories have been located at points where the water power is available, but a careful examination failed to reveal any pollution of the water by them.

RIDGEWOOD WATER.

Time does not permit me to give any details with regard to the water supplied to our Brooklyn neighbors. A glance at the diagram will enable you to see that the Ridgewood water is even purer than the Croton, though the difference is so slight that it would hardly make it worth while for us to emigrate across the East river for better water.

CONCLUSION.

Water is the great mechanical power in nature. It is the great leveler; it moves mountains and fills valleys. All our stratified rocks, sandstones, slates and limestones, were formed by the action of water. To the solvent power of water and its chemical action, we owe our useful minerals, our metallic deposits, our iron, copper, zinc, gold and silver ores, and even coal. To its physical properties and relations to heat, we owe all the phenomena of clouds, dew, rain, fog, snow and frost. It supports the plants, brings them their mineral food from the soil, and protects them from excessive heat. Animals are equally dependent upon it. Yet, after all, it is only the agent of the sun; it is sun power that makes plants grow; it is sun power that moves everything in the world, and water is merely the sun's agent.

The loss of water would produce the same condition of things on the earth that we notice now in the moon. Although we have such a vast quantity of water, yet it is only 1-24000 part of the earth or 0.0042 per cent. The crystalline rocks at the earth's surface now contain a larger quantity of water than this, and the moment our earth cools enough to absorb four thousandths of one per cent of moisture, the ocean will disappear. If we should lose our ocean, we should lose our atmosphere also. The openings or pores in the rocks will receive it by gravitation, and we shall have the same condition of things as exists now in the moon *

I have endeavored, as far as it is possible in a single lecture, to sketch the important relations of this all-pervading fluid, and have shown you that it is the source of all our health and well-being: but I shall have failed in my effort if I have not fully impressed you with the great truth that it may bring disease and death instead of health, and that our sources of supply cannot be too carefully studied.

[* This remark of Prof. Chandler, recalls a little calculation made by me several years since, the seemingly incredible result of which was communicated to the New York Lyceum of Natural History, to the effect that the rocks of the Hudson River Palisades contain, above tide level, more water than the great river that flows at their feet!—H. W.]

A Small Pox Specific from Coal-Tar.

XYLOLE.—This hydrocarbon is likely to become of great importance, if its application in cases of small-pox is really followed by such good results as have hitherto been obtained at Berlin. The Berlin *Klinische Wochenschrift* states that Dr. Zuelzer, Senior Physician at the Charity Hospital, had there administered xylole in cases of small-pox, with the most complete success. It is given in doses of from three to five drops for children, ten to fifteen drops for adults, every hour to every three hours. It is harmless, because as much as a teaspoonful at a time has been taken. The most convenient form of taking it is in capsules, as already supplied by a Berlin firm, and containing three, five, eight and twelve drops each. The specification is not yet clearly defined, but early information on this point is promised. The theory at present is that xylole is taken up by the blood, and acts as a disinfectant. The absolute purity of the xylole is important, as toluole and other analogous compounds do not possess this peculiar action, and it seems there are some practical difficulties in obtaining xylole absolutely pure. Xylole or xylene, $C^{16}H^{10}$, was first separated from coal naphtha by Dr. Hugo Muller; it is obtained by fractional distillation until a distillate is obtained of about 140° C. boiling-point; this is mixed with sulphuric acid, which dissolves xylole forming xylole-sulphuric acid; this acid is decomposed by dry distillation, and the xylole thus obtained is further purified. Pure xylole is colorless, it has a faint odor, somewhat like benzole but different; boiling-point, 139° C.; specific gravity 866.—*Pharmaceutical Journal.*

Correspondence.

[Correspondents, in all cases, should sign their communications with their names and address in full—not necessarily for publication, but as a guarantee of good faith.—Ed.

The Philadelphia Gas-Light Company.

Terre Haute, March 14, 1872.

Mr. Editor: Through the kindness of a friend in Philadelphia I have just received the "Annual Report of the Trustees of the Philadelphia Gas Works," which contains statements of the results of the last year's (1871) workings, by the Trustees; the Report of the Cashier, and the Engineer's Report.

It appears that there was 156,453 net tons of coal carbonized, with a yield of 1,338,972,000 cubic feet of gas, showing an average yield of 4.25 cu. ft. to the pound of coal (from I judge Pittsburgh coal—that is Penn and Westmoreland Coal Companies Coal) with an average candle power of 14.95 candles; also 4.484,-793 bushels of coke.

There was run last year nearly 3½ miles of pipe, making in all nearly 571 miles of gas main.

The "Report" contains a lithograph of the new retort house, with an interesting description by the Engineer, Thomas R. Brown Esq., of the new buildings erected on and near the site of the old works, built by Samuel V. Merrick Esq., in 1835, at the N. W. corner of Market and 23d streets.

The old works were removed; in their place has been erected the new Retort House (or rather three houses) a house containing the condensers, washers, and coal store room, and a house for storage, with a basement or cellar, used as a tar-well, with a capacity of 6,300 barrels.

Across 23d street, on the N. W. corner of the holder lot, is a new two story building, at the south end of which is the Superintendent's offices, in the center the meter room, and, on the north end, Coke and Telegraph offices; the upstairs being used for proving meters and storage.

A new holder with a capacity of one million cubic feet, has been completed on the same grounds, and in the center of the lot, a valve and boiler house has been built.

The Exhausters, Purifiers, (at present eight in number 25 × 25 inches, with seven layers of trays in each, dry center valves, and 20 inch connections) etc., etc., have been placed in a building on 24th street, south of Market, and a little farther south on the river front nearer to Chestnut street, three perpetual lime-kilns have been erected. Everything appears to have been done in the most substantial manner and with the latest improvements known to the gas fraternity, that have been proved to be of practical value. The station meters are worthy of mention, being 14 feet in diameter and 14 feet in length (apparently a trifle larger than those used in the smaller works in the West) and having a capacity, each, of 1,750,000 cubic feet in 24 hours; one furnished by the American Meter Co., and the other by Harris, Bros., both of Philadelphia.

The engineer concludes his description of the buildings with an apparently well merited compliment to Messrs. Jesse W. Starr & Sons, of Camden, N. J., for the "prompt, careful, and efficient manner in which they have performed the work"; a work he believes "has no parallel in the erection of gas works in this country," they having in one hundred and sixty working days, from the time the last fire was put out, erected the buildings, and put 450 clay retorts in action. There was used in constructing the works 4,500,000 lbs. of wrought and cast iron work.

There is one item in the engineer's report, which I think a little curious, as I cannot exactly see how the result can be reached. I suppose the burners on the public lamps are not over six feet per hour, yet when we take the number of lamps and the total amount of hours lighted, I find, to use up the amount of gas consumed, it would take a burner of over 12 feet per hour. Thus—number of lamps, 8204 ÷ 229,120,197 cubic feet=27928 cubic feet per lamp.

27928 c. ft. ÷2251.15 (hours)=12.4 cu. ft. per hour!

Another point; I do not conceive that the average candle power reached (14.95 candles) rendered it necessary to consume the amount of lime that appears to have been used. Mr. Hughes, in his work (page 180) says: "Mr Clegg's estimate of a bushel of lime for 10,000 cubic feet of gas is undoubtedly too high." That would allow 5000 cubic feet to the bushel of hydrate of lime. It appears it took 282,554 bushels of lime to purify 1,338,972,000 cubic feet, or 4738 cubic feet to the bushel, which makes 2369 cubic feet to the bushel of hydrate of lime when 5000 is said by Hughes to be too high an estimate! I understand the engineer, when he says a bushel of lime, he does not mean slaked lime. R.

P. S. The engineer makes no mention of using "Grahamite" or any other material, to enrich the quality of his gas. I should like to know if any was used. John C. Cresson, Esq., engineer, in days of "auld lang syne," frequently used oil cake and rosin to help the quality of the gas then made. R.

The Improvements at the Newburgh Works.

Office National Coal Gas Co.,
No. 4 Warren street, N. Y.,
March 23rd, 1871.

Mr. Editor: In your issue of March 16th you refer, in your editorial columns, to the process of this company (as recently adopted by the gas company of Newburgh, N. Y.; and, in a private communication you request full and authentic information respecting the operations in that city. It is a pleasure as well as a duty, to comply with your request, and I beg to lay before you and your readers, a number of documents, comprising the records of the working of our process there for *six months*, and a statement from Judge Monell, the president of that company, regarding the same; and also the records for ten months at Fair Haven, Ct., with the statement of T. M. Cox, Esq., the superintendent, of the New Haven Gas Co., certifying the results there. To state the facts briefly, I may say; that at Fair Haven 6,235,510 cubic feet of gas was made, and the average yield, for *ten months*, was 6.41 feet per lb. of coal, with an average candle power of 16.91 candles, by a Bunsen photometer.

At Newburgh over 6,000,000 feet of gas have been made, under our process, with equally good results. In fact, the yield for three months, averaged 6.52 feet per lb. of coal, of 17 to 18 candle gas. But they had only a "Lowe's jet" photometer rated for common gas, which did not register our gas within two or three candles of its true candle power. The chemical basis of our gas being different, the same height or column of flame, is found to give two or three candles more light than common gas. This is conceded by experts who have examined the subject..

During one month, when the gas, by the "jet" photometer, averaged 17.1 candles, it was found to be *too rich*, and was therefore reduced. A Bunsen photometer would have shown it to be at least 19 candles. Our process has been most rigidly tested, both scientifically and practically; and we challenge any one, by *any other process*, to show (by *as well attested* results) gas of equal yield, brilliancy, purity, permanency, regularity of production, and cheapness of manufacture.

By our process, all "scrubbing" is wholly dispensed with. No solid carbon forms in the retorts; no naphthaline or other stoppages in the pipes; no perceptible loss occurs by condensation, even in the coldest weather; and tar is never found in the purifying boxes, as under the old process; and by no possibility can *condensed tarry vapors* be ever found, filling the service pipes, and *oozing* from the burners, as under some of the pretended improvements of the day.

We have entirely overcome a mechanical difficulty which arose from a liability of the hydrogen retorts and superheaters to crack; and are now prepared to offer liberal terms to those who desire the right to make and furnish to their customers a pure coal gas, which gives a brilliant, steady light, at a cheaper rate, and a higher profit, than those at which they can now afford poor gas.

Yours truly,
H. P. Allen, President.

[Among the papers submitted to us by Mr. Allen are a number which will interest the readers of the American Gas-Light Journal, and which we therefore reserve for future use.—Ed.]

Office of the Newburgh Gas-Light Co.,
February 6th, 1872.

I hereby certify that the Gwynne-Harris hydro-carbon process for the manufacture of gas, was introduced into the Newburgh Gas-Light Company's works about the middle of August last, under the supervision of Mr. G. W. Harris, engineer of the National Coal Gas Company, with one bench of threes, and one bench of two Harris patent retorts; that said retorts have been run from that time to this continuously, without any interruption, and are still working, to the entire satisfaction of our company; that having necessarily been run in connection with one bench of fives under the old process, it is impossible to arrive at definite results, but enough has been demonstrated to satisfy us of the great value of the hydro-carbon process for the manufacture of gas.

The following are some of the facts that clearly appear to be the legitimate results of the working of this process, viz.:

A purer and better gas can be produced with much greater regularity and uniformity than under the old process; all "scrubbing" of the gas is entirely dispensed with; no tar is formed in the mouth of the retort, or in the purifying boxes.

We have not been troubled at all for the last five months with naphthaline or stoppages of the pipes. There is very little, if any, condensation of the gas made by this process, even during the winter season. This is incontrovertibly proven by our books. But the fact that the gas consumers in Newburgh are better pleased with the quality of the gas delivered this winter than ever before (although only two-thirds were made by this process), and the large yield, and the unexpected increase in the profits to our company for the last six months, induced us to close the bargain at once for the purchase of the right for Newburgh, which we have done, and have made all necessary arrangements for using said process in our entire works.

John J. Monell,
Pres't of Newburgh Gas-Light Co.

Incendiary Oils in the West.

[By favor of Prof. A. E. Foote, of the Iowa State Agricultural College, we are enabled to give the following extract from a report of his, on this highly important subject.—Ed.]

"Little care will assure one of perfect safety in the use of kerosene. A simple experiment will decide as to the quality of the article in question. The United States law says that no burning fluid, whose burning point is below 110° F., shall be sold. A special act was passed by Congress, March 2d, 1867, to punish by fine and imprisonment all who should sell burning fluid below this standard, and the United States Grand Jury advised the re-enactment of this law by our State Legislature. A lighted match should be instantly extinguished by being thrust into good oil of the legal standard. The following simple test, which may be applied by any one, furnishes information as to the safety of the fluid tested. Half fill an ordinary bowl with boiling water. Insert the bulb of a thermometer. The mercury will rise to about 200 deg. F. Slowly pour in cold water, stirring with a thermometer till the temperature is reduced to 110° (the legal standard). Now pour on the surface of the water a quantity of the fluid to be tested, and apply a match. If the fluid burns, reject it as dangerous. If a thermometer is not at hand, fill the bowl one quarter full of boiling water; add twice as much water that has been standing in the room for some time; pour on the fluid and apply the lighted match. If the fluid burns, reject it. Always use the thermometer if possible, but test the oil you buy at any rate. If you do, we will insure you against danger, from the burning fluid you use, for nothing.

"In spite of the fact that insurance policies are forfeited by using or storing these dangerous fluids in any store or dwelling-house, not only are large quantities of 'Danforths,' 'Eureka,' 'Safety,' 'Crystal,' 'Carbon,' and 'Sunlight' oils sold; but kerosene is largely adulterated with the lighter oils, and to cap the climax, gasoline is sold as a safe burning fluid. A man might more safely store a keg of gunpowder or a can of nitro-glycerine under his bed than to use the above mentioned fluids for lighting purposes. There are people who are willing to run any risk for the sake of making or saving a few dimes, but we would advise such to examine their insurance policies carefully, and see if they do not distinctly specify the fluids that may be burned. Gasoline or naphtha, the basis of the secret (not patent, for they cannot get a patent on them,) oils is not specified among these, but is speci-

fied among the articles the storage or use of which forfeits the policy.

"Below the point at which an oil will burn, light blue flames will run across its surface, showing that some inflammable gas is given off. The temperature at which this takes place is called the flashing point. At my request, Mr. I. W. Smith, of our State Agricultural College Laboratory, made the following tests with 'Sunlight' and 'Safety' oils, and some of the materials used in manufacturing these *valuable* burning fluids:

FLUIDS.	Sp. Grav. water 1000.	Flashing Point.	Burning Pont.
Sunlight Oil.....	0.730	25° F.	37.5° F.
Safety Oil.....	0.683	below 0° F.	below 0° F.
Kerosene used at farm house.....	0.800	115° F.	121° good.
Benzine.....	0.721	18° F.	34.5° F
Gasoline.....	0.692	below 0° F.	below 7° F.
Alcohol.....	0.817	92 per cent.	50° F.

"It is claimed by some of the men who vend these fluids, that the low point at which the oil burns, prevents it from igniting wood, cloth, etc., and that there is no danger of fire in upsetting a lamp. In the first place, both gasoline, kerosene, and the secret burning fluids, are compounds of carbon and hydrogen, and there is just as much heat produced in the burning of carbon and hydrogen in one form as in another. But the one which burns most rapidly will prodnce the greatest amount of heat in the shortest space of time. The secret oil and gasoline venders claim that their fluids will burn most rapidly; therefore, out of their own mouths are they condemned, for if their fluids burn more rapidly than kerosene, they will produce more heat in a given space of time, and hence will be more dangerous. They perform the deceptive experiment of pouring gasoline, etc., upon a board, or on the floor, light it, then pouring kerosene over the same floor and lighting it. The kerosene burns the floor, while the gasoline, etc., apparently does not. But if yon watch them, you will find them putting out the fire along the cracks in the floor and edges of the wall. The gasoline burns so rapidly from a smooth surface, that the heat mainly rises, but wherever rough surface or inflammable material is presented, a fire is kindled. A number of experiments, with the 'Safety Oil,' were tried, simulating the state of things likely to exist in a room, when a lamp was upset, and in every case the material was set on fire.

"The only effective ingredients in the 'Sunlight,' as in most of the secret oils that I have examined, are the dangerous gasoline, naphtha, and alcohol. Potatoes, salt, soda, and the essential oils are introduced to deceive. The conclusions then are, that every person should test the oil he uses; that our legislators should, this coming winter, as recommended by the grand jury, indorse the United States law; and that then the people should see to it, that no person is allowed to sell this Greek fire and liquid death, to the destruction of the ignorant and innocent. Intelligent (understanding these dangers) men may deal in these fluids. Honest men may deal in them. Can an honest *and* intelligent man deal in them? We must alarm the first, and inform the second class."

Shall We Have a Water Famine?

When the Croton water was introduced into this city, it was supposed that the supply would far exceed any demand that could be made upon it. Since then, the rapid growth of New York has greatly increased the amount of water daily needed to supply the wants of the population, while the gradual clearing of the forests, combined, perhaps, with other causes not yet very clearly understood, have made our summer drouths longer and more frequent, and thus diminished the amount of water flowing into this aqueduct. Last year the average consumption of Croton water in this city was about 80,000,000 gallons daily, and during the present year it is estimated that this average will be increased to at least 85,000,000. During the dry season, which regularly occurs in July or August, the Croton Lake supplies only about 30,000,000 daily. The reservoirs are relied upon to make up the deficiency, but a prolonged drouth, such as happened in the summer of 1870, would next summer, exhaust the reservoirs, and leave this city absolutely without water.

When the consequences of such a calamity are considered, the supreme necessity of effective and immediate measures to prevent the possibility of a water famine next summer must be conceded. The Croton Board is constructing a new dam, which will greatly increase the supply of water, but this work will not be completed until 1873. Meanwhile, our sole dependence next summer must be upon a system of dams and reservoirs that are inadequate to meet the contingency of a prolonged drouth. Already the unusual absence of rain during the past three months, gives us reason to apprehend an unusually dry season during the approaching hot weather. Should the drouth of 1870 be repeated next summer, we should be without a drop of fresh water, except the few bucketsfull which might remain in private wells and cisterns.

In order to secure the city from such a contingency, the Legislature last year authorized the Croton Board to connect certain lakes in Putnam county with the aqueduct, and use the water thus obtained to make up for the deficiences of the present supply. Tweed, however, interested himself in the matter, and the result was that the act was so constructed as to enable him to plan a barefaced robbery of our tax-payers. The present Legislature has therefore been asked to repeal the act in question, and a bill for that purpose has already passed to a third reading in the Assembly.

Now, there can be no defense of Tweed's rascalities. He procured the passage of the act of 1871 in order to put money into his pockets; and if the act remains in force, his scheme of robbery will have succeeded. Nevertheless, the Legislature cannot afford to take a course which will endanger the safety of this community. If the act authorizing the use of the Putnam county lakes be repealed, some future legislation which will supply this city with water, without filling Tweed's pockets with stolen money, is absolutely necessary. In any event, New York must not be left at the mercy of the weather. The certainty that a drouth would cut off our water supply is a fact of such tremendous import, that not a moment should be lost in providing against the danger. Otherwise, we may next summer find ourselves in a condition, compared with which the presence of the cholera or the yellow fever would be a trifling matter.—*New York Times, March* 16.

Scarcity of Water in the Canals.

The Lockport *Journal* says: "We learn that the canal authorities have serious apprehensions that there will be a greater scarcity of water the coming season, than has been experienced before, since the canals were constructed. It is said that the reservoirs were never so low at this season of the year, and the principal dependence for filling them is in heavy rains, since there is very little snow in the water sheds. Commissioner Wright has issued orders throughout the middle division, closing the outlets of all the reservoirs, that no water be wasted, and all that falls be saved. This action by Commissioner Wright will effect serious damage to manufacturers owning mill property upon some of the streams, particularly those upon the Skaneateles Lake outlet and on Seneca River. The proprietors of these have had the enterprise and foresight to provide themselves with steam engines, and will not be seriously affected by the cutting off of the water power. With others, it will go hard, particularly with their operatives, since the canal seldom opens before the first of May.—*N. Y. Evening Post.*

Protection of Water Pipes in Mines.

In our visit to the mines of the Comstock Lode we found complaint of the manner in which iron water-pipes gave out under the biting touch of the vitriolic impurities of the moisture distilled from the crevices of the rock. Galvanizing or coating with zinc gave practically no protection from corrosion, and indeed no available remedy was known. The same difficulty appears to be experienced in the mines in many parts of Europe; and in those of Siberia, where pyrites are common, the trouble is said to be now very effectually avoided by a novel method of enamelling the internal surface of the pipes. The process involves a preliminary exposure of three hours to a bath of oil of vitriol —sulphuric acid. After this they are washed with water, and are brushed with a composition composed of thirty-four parts silica, fifteen of borax, and two of soda, and are then placed in a retort at a dull-red heat for about ten minutes. This is the first coating. A second is laid on, composed of thirty-four parts of feldspar, nineteen of silica, twenty-four of borax, sixteen of tin oxyd, four of fluorspar, nine of soda, and three of niter. This is melted to a mass in a crucible, then ground to a fine paste with water, and in this condition applied to the pipe, which done the pipe is heated to a white heat, and maintained thereat for twenty minutes. This insures the perfect fixing of the enamel. Before the pipe has become wholly cool it receives an external application of coal-tar, and is then ready for use. There seems no good reason why pipe treated in this manner should not prove well adapted for purposes for which, owing to its inability to corrosion, ordinary iron pipe is inadmissable.—*Am. Artisan.*

[The above remarks probably apply to some coal mines, in which pyrites so often abound. It is hence that we cite them here.—Ed.]

Current Gas Items.

There are said to be five hundred miles of gas pipe underlying the streets of New York city.

The East Saginaw Gas Company have hitherto used wooden pipe in laying their mains.

The gas works connected with the Glasgow Gingham Mill at South Hadley Falls, blew up recently.

The people of East Boston think it would be an improvement to light the ferry boats with gas.

The bituminous coals of Indiana have been found to be abundant in illuminating gas.

The Parker House, Boston, gas bills amount to about $11,000 annually.

Articles of incorporation have been filed in the office of the Secretary of State, by the Mount Pleasant Gas-Light Co., Mount Pleasant, Iowa; capital, $100,000.

The New Haven Gas Company proposes to spend $200,000 in improvements the present season. Among other things a new gasometer, 45 feet high, with a diameter of 110 feet, will be built.

Poughkeepsie has gas conundrums. "For instance," says the *Eagle* of that city, "A and B live on the same street, opposite each other, and each use the same number of burners, yet B's bill is almost twice as large as A's."

The Meter Rent Suit.

"We take the following from the *Bloomington Pantagraph:*

The hearing of Bloomington Gas Company vs. Albert W. Holmes, which was commenced on the 9th March, was resumed. This is a suit for gas bill and meter rent for the months of April, May, June and July, 1871. The defendant made a tender of the amount due for gas alone, which was accepted, and thus the only question left was, whether meter rent could properly be collected in addition to the bill for gas. Under the instructions of the court the jury found a verdict for the plaintiff for $1, the regular charge of 25 cents a month."

The editor of the above named paper says:

"It will be seen by our Circuit Court report this morning (March 9th) that the jury in the case of the Bloomington Gas-Light Company vs. A. B. Holmes, under the instruction of the court, brought in a verdict in favor of the plaintiff. This virtually settles the question that gas consumers, under the rules of the company, are legally liable for meter rent."

New Jersey Marsh Drainage.—The New Jersey House passed a bill, which the Senate Committee, however, has, we find reported against, to repeal the act incorporating the Driggs Drainage Company, so far as it relates to marsh lands within the limits of Newark. Should this repealer pass the Senate, the reclamation of the meadows between Newark and Elizabeth will be arrested just as the arrangements for commencing the work have been completed.

Southern Indiana is finding itself rich in block coal, a very valuable variety for treating iron ore, and also plenty of iron ore itself in happy proximity. Consequently, there is a great increase of the iron-making business in that section.

The Coal Beds of Missouri are said to cover an area of two thousand seven hundred square miles, mostly in the northwest.

WILLIAM FARMER,

ARCHITECT AND GENERAL GAS ENGINEER,

111 BROADWAY, TRINITY BUILDING, Room 91, New York.

WILLIAM FARMER may be consulted upon all matters connected with the construction of GAS WORKS and other buildings. **Will furnish General and Detail Drawings, Specifications and Estimates for Gas Works of any capacity, Retort Settings, Condensers, Washers, Exhausters, Purifiers, Holders, Coal Hoisting Apparatus, Iron Roofs, and every description of Machinery required in the Manufacturing of Gas.**

PATENTEE OF THE FOLLOWING INVENTIONS:

Exhausters for Gas and Foul Lime Ventilation,
Dumping Barrows for Coal, Coke and Lime,
Blowers for Forgers,
Pumps for Water, &c., &c.

REFERENCES:

CHAS. ROOME, President Manhattan Gas-Light Company, N. Y.
SAMUEL DOWN, President American Meter Company, N. Y.
C. VANDERVOORT SMITH, Engineer Manhattan Gas-Light Company, N. Y.
CHARLES MOWTON, Engineer New York Gas-Light Company, N. Y.
SAMUEL P. PARHAM, Engineer Mutual Gas-Light Company, N. Y.
Prof. HENRY WURTZ, Editor AMERICAN GAS-LIGHT JOURNAL.
HENRY J. DAVISON, Engineer, 77 Liberty Street, N. Y.
HERRING & FLOYD, Oregon Iron Foundry, 738 Greenwich Street, N. Y.
FREDERICK SABBATON, Engineer Troy Gas-Light Company, Troy, N. Y.
Col. WHITE, Engineer People's Gas-Light Company, Williamsburgh, N. Y.
GEORGE W. PARSONS, Sup't and Eng'r, Rochester Gas-Light Co., Rochester, N. Y.
GEORGE W. EDGE, Engineer, Jersey City Gas-Light Co., Jersey City, N. J.
J. H. GAUTIER & Co., Fire Brick Works, Jersey City, N. J.
Professor SILLIMAN, New Haven, Conn.
JOHN HARRISON, Engineer People's Gas-Light Company, Baltimore, Md.
CHARLES FABEN, Superintendent and Engineer Toledo Gas-Light Co., Toledo, O.
PETER F. BURTIS, Supt. and Engineer, Chicago Gas-Light Co., Chicago, Ill.
JAMES R. SMEDBERG, Consulting Engineer, San Francisco Gas-Light Co., Cal. [251-

A REVOLUTION

In the Manufacture of Illuminating Gas from Coal,

IN EXISTING PUBLIC GAS WORKS.

3,000 More Feet of Gas from a Ton of Coal, without Change of Works, or Increased Cost.

DARIUS DAVISON, No. 4 Dey Street, N. Y., is now prepared to introduce his several Patented Improvements in the Manufacture of Gas from Coal only, into Gas Works throughout the United States, or sell rights under his Patents in the United States, Europe, Canada, Cuba, Etc., to parties desiring to become interested therein, on favorable terms.

Gas made from Naphtha or Water in public Gas Works is now rendered inexpedient and useless.

Coal, the only true and reliable basis and material, properly treated, for making Gas in public Gas Works.

Inventions fully tested, and results clearly ascertained, by long practical operation.

Full information can be had personally, or by letter, at No. 4. Dey street (first floor), New York. 291-unl

GEO. STACEY. HENRY RANSHAW. WM. STACEY

GEO. STACEY & CO.,

MANUFACTURERS OF SINGLE AND TELESCOPIC

GAS-HOLDERS,

AND ALL KINDS OF

Cast and Wrought Iron Work

Used in the Erection of Gas and Coal Oil Works.

Foundry on MILL STREET; Nos. 33, 35, 37 and 39.
Office and Wrought Iron Works on RAMSAY STREET, Cincinnati, Ohio.

REFERENCE.

Cincinnati Gas-Light Co.	Baton Rouge, La., Gas Co.
Indianopolis Gas Co.	Saginaw, Mich., Gas Co.
Dayton, O., Gaslight Co.	Oshkosh, Wis., Gas Co.
Covington, Ky., Gas Co.	Peoria, Ill., Gas Co.
Springfield, O., Gas Co.	Quincy, Ill., Gas Co.
Terre Haute, Ind., Gas Co.	Champaign, Ills., Gas Co.
Madison, Ind., Gas Co.	Carlinville, Ill., Gas Co.
Kansas City, Mo., Gas Co.	Bowling Green, Ky., Gas Co.
Topeka, Kansas, Gas Co.	Hamilton, Ohio, Gas Co.
Burlington, Iowa, Gas Co.	Vicksburg, Miss., Gas Co.
Nashville, Tenn., Gas Co.	Denver City, Cal., Gas Co.

R. T. Coverdale, Eng'r Cincinnati, and others.

JERSEY CITY

GAS METER WORKS.

R. M. POTTER & CO.,

MANUFACTURERS OF

CONSUMERS GAS METERS, WET AND DRY,

Station Meters, Center Seals, Governors,

PRESSURE REGISTERS,

AND ALL KINDS OF PRESSURE GUAGES.

Experimental Meters and Standard Test Gas holders,

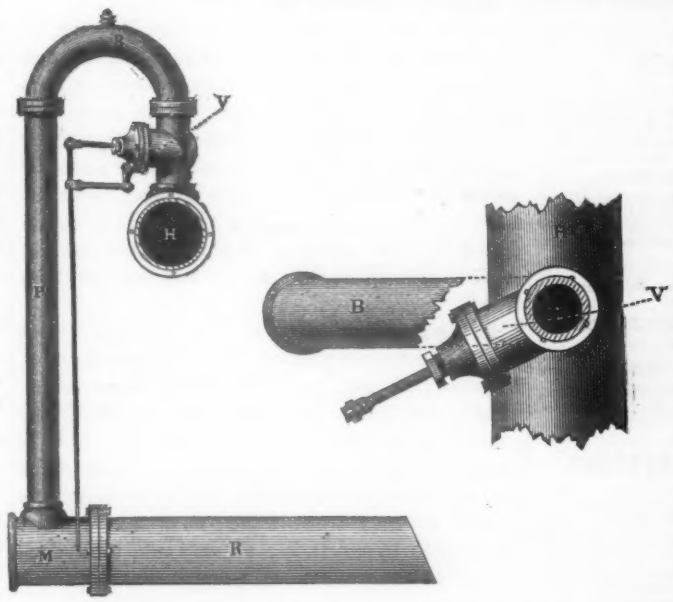
☞ And all apparatus in use at the Gas Works

14 Morris St., Jersey City, N. J. (1y

The American Coal Gas-Light Improvement Co.

ARE THE SOLE OWNERS OF THE

GIBSON IMPROVEMENT



In the manufacture of Coal Gas by means of which Dip-Pipes are dispensed with, the deposit of Carbon in the Retorts prevented, and a very large saving is effected.

Licenses for its use will be granted; also the parts necessary will be supplied to order, on application at their office,

No. 79 Water street, Boston, or
No. 41 Pine street, Room 1 New York.

R Retort.
M Mouth-piece.
P Stand-pipe.
B Bridge-pipe.
H Hydraulic main.
V Valve-substitute for Dip-pipe.

MURRAY & BAKER,

Practical Builders,

And Contractors for the Erection of Gas Works,

MANUFACTURERS OF ALL THE LATEST AND MOST IMPROVED APPARATUS AND TOOLS FOR THE MANUFACTURE & DISTRIBUTION OF COAL GAS.

☞ WORKS AT THE RAILWAY DEPOTS,

FORT WAYNE, INDIANA.

We manufacture Bench Castings, Washers, "The Immersed Multitubular," and Atmospheric Condensers, Wet and Dry-Lime Purifiers, Dry Center Seals, Telescopic and Single Gas Holders, Wrought Iron Trussed Roof for Iron or Slate, Wood and Iron Trays for Purifiers, Coke and Coal Carts, Wrought Iron Screening Shovels and Castings, and Wrought Work of every description for Gas-Works.

As Mr. Murray is a Practical Draughtsman, we will furnish plans and specifications to parties or associations, or will wait personally upon parties contemplating the construction of new works, or the alteration or extension of old ones.

The most satisfactory references can be given, if required, of the experience and commercial fairness which characterizes our dealings.

We would respectfully invite Western men to call and see our patterns and works here, MURRAY & BAKER,
198-1y Fort Wayne, Indiana.

ATLANTIC DOCK

Iron & Machine Works,

FERRIS, WOLCOTT AND DYKEMAN STREETS,

South Brooklyn.

HOY, KENNEDY & CO., AGENTS.

Office 98 Liberty Street. P. O. Box 2,348

HOY, KENNEDY & CO.,

ENGINEERS AND CONTRACTORS

For the Erection or Extension of Gas Works.

PLANS, SPECIFICATIONS AND ESTIMATES.

MANUFACTURERS of every kind of Gas Machinery, Retorts Bench Castings, Wrought Iron Work, Multitubular and Air Condensers, Washers, Scrubbers, Purifiers, Exhausters with every equipment complete for large or small Works, Gasholders, Telescopic or Single; Iron Roof Frames with Cornice Gutters, covered with Corrugated Iron or Slate; Iron Doors and Iron Pivot Blind Windows; Coke Barrows, Fire Tools, Retort Lids, Cotter Bars and Screws, Stop Valves, Tar Valves for Regulating Dip in Hydraulic Mains, Pressure Governors for Street Mains, and Compensators for Exhausters that are unrivalled for unvarying accuracy Steam Engines, Boilers, Etc., Etc.

Agents for G. W. EDGE'S PROCESS for removing Carbon from Retorts.

Post Office Box 2,348, Office 98 Liberty st

THE AMERICAN

GAS-LIGHT JOURNAL

AND

Chemical Repertory,

PUBLISHED ON THE 2D AND 16TH OF EACH MONTH,

At No. 42 Pine Street, New York.

A. M. CALLENDER & CO.,
PROPRIETORS.

EDITOR—PROF. HENRY WURTZ.
Editor's Private Office, 26 Pine St., Room 36.

This is a recognized official organ of—
LIGHT, HEAT, MINING INTERESTS, STEAM, WATER-SUPPLY, PATENTED INVENTIONS, VENTILATION, SANITARY IMPOVEMENT, AND GENERAL CHEMICAL SCIENCE.

TERMS:

SUBSCRIPTION—Three Dollars per annum, in advance.

AGENTS:

NEW YORK—AMERICAN NEWS COMPANY, 119 and 121 Nassau St
BOSTON—S. M. PETTENGILL & Co., 6 State Street.
PHILADELPHIA—COE, WETHERILL & Co., Ledger Buildings, Phila.
Germany—B. WESTERMANN & Co., of New York.
Great Britain—TRUBNER & Co., 60 Paternoster Row, London.
France—LE JOURNAL DE L'ECLAIRAGE AU GAZ, 25 Boulevard Poissonniere.
Brussels, Belgium—HENRI BERGE.

☞ All communications to be addressed to "THE EDITOR, No. 42 Pine Street, Room 18, New York.

TUESDAY, APRIL 2, 1872.

WISHING TO MAKE THIS JOURNAL an organ of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, the publishers solicit letters from all among them who make the study of these subjects a pleasure, or a profession.

Subscribers would confer a favor upon us by remitting *CHECKS*, or *POST OFFICE MONEY ORDERS*, as we are frequent losers where money is enclosed in letters.

☞ NEWS AGENCY.—The American News Company, 119 and 121 Nassau street, New York agents for this Journal. News dealers will please send orders to them.

NOTICE.

☞ *All Collections for Advertisements, Subscriptions, etc., are made directly from this Office. We have Agents to solicit the same, but they are not authorized to Receipt for Money.*

TO OUR SUBSCRIBERS AND PATRONS.

In making remittances for subscriptions, always procure a draft on New York, or a POST OFFICE MONEY ORDER, if possible. Where neither of these can be procured, send the money, but always in a REGISTERED LETTER. The registration fee has been reduced to fifteen cents, and the registration system has been found by the postal authorities to be virtually an absolute protection against losses by mail. ALL Postmasters are obliged to register letters whenever requested to do so.

CONTENTS.

☞ An asterisk (*) denotes an illustrated article.

Patent Pipe-Joint*..... 99
River Water..... 99
Restoring Charred Manuscript..... 99
Chemical Excerpts..... 100
The West Bloomfield Gas Well..... 101
Pittsburgh and Allegheny Gas Inspection..... 101
A Lecture on Water*..... 101
A Small Pox Specific from Coal Tar..... 102
CORRESPONDENCE.—
The Philadelphia Gas Light Company..... 103
The Improvement at the Newburgh Works..... 103
Incendiary Oils in the West..... 103
Shall We have a Water Famine..... 104
Scarcity of Water in the Canals..... 104
Protection of Water Pipes in Mines..... 104
Current Gas Items..... 104
The Meter Rent Suit..... 104
The New Jersey Marsh Drainage Bill..... 104
EDITORIALS—
Scientific Legislation..... 106
The West Bloomfield Gas Well..... 106
The American Hydrocarbon Process..... 106
Patent Pipe-Joint..... 107
Errors in the Last Issue..... 107
The Synopsis of British Gas Lighting..... 107
SUPPLEMENT.—
Lighting Gas by Electricity..... 115
Irrigation by Artesian Wells..... 115
Annual Report of the Commissioners of Patents for the year 1871..... 115
Carbonic acid and Carbonic Oxide as Poisons..... 115
Where the Alcohol Goes to..... 115
Petroleum Trade of Last Year..... 115
The Weather for the Winters of 1870-71 and 1871-72..... 116
How to Use the Thermometer..... 116
Dangerous Gases in Bedrooms..... 116

SCIENTIFIC LEGISLATION.

In our last issue, we copied, as a laughing-stock for our readers, a bill introduced into the Assembly by Mr. Moulton, supposing, from the absurdity of the thing, that we were merely putting on record, as a curiosity, one of the "waifs and strays" which would never again be heard of. Since then, however, we have been astounded (we were going to write; but why should anything astound, or even surprise us, from that quarter?)—at any rate, we observe, that the assembled wisdom (?) of the said Assembly, has actually passed this bill to the third reading, without opposition. We are therefore led, perforce, to devote a little space to some of the points in it.

We have heard that the present Legislature claims to be *the* "Reform Legislature." This will account therefore for its approval of an attempt to reform, not only the latest and most improved methods of manufacturing gas, but the Laws of *Nature* herself. For example, to the latter category belongs the stipulation that, hereafter, gas-coal shall not evolve gas containing more than *one-tenth of one per cent. of carbonic oxide?*

As no one ever yet succeeded in separating carbonic oxide from coal-gas, in the way of purification; the conclusion is inevitable, that the framers of this bill intend that it shalll not be evolved from the coal.

As to the other chemical absurdities and impracticabilities involved in this bill, they are almost without end, and we shall mention but two or three. The London Gas Companies experience great difficulties, in fact some of them often fail, in complying with the Parliamentary requisition that the amount of sulphur shall not be above 20 grains in 100 cubic feet. Here we have, however, the preposterous regulation that it shall be reduced to *three grains* in the same volume. A similar remark applies to the ammonia-restriction.

In the first section, what is to be understood by "condensable matter;" condensable how, or by what? By cold, pressure, chemical agents, or what? By the latter, almost the whole of *any* coal-gas may be said to be condensable. If it is meant, however, to indicate the proportion of hydrocarbons condensable, say, by fuming sulphuric acid, or by bromine; as it would seem reasonable to conclude; we only ask, what contemptible ignoramus has prompted such trash? How many 14 to 15 candle gases; nay, how many 10 candle *cannel* gases would yield ten per cent. of such condensable matter?

The sixth section is especially rich, deserving repetition here, in fact:

Sec. 6. Every consumer of gas may, at his option, procure the inspection and testing of the gas furnished through his meter by any skilled chemist. Upon the certificate and affidavit of such chemist showing that such gas is deficient in quality or in pressure, as required by the foregoing sections 1, 2, and 3, such consumer may make complaint before any Grand Jury against the company furnishing such gas. The Grand Jury shall, upon the proofs of such deficiency as shall appear by the examination under oath of the chemist, making such inspection and test, proceed to indict such company as for a misdemeanor.

Just as if legislative permission were required for a consumer to employ a chemist in the manner stated; that is, any consumer who should choose to set up in his house a gas laboratory and a photometric room. Doubtless, however, after this *special permission*, the city will soon be filled with such expensive private gas-laboratories, and the Courts with such indictments. "It is an ill wind"—and so on. Two professions, at least, will profit, the chemists and the lawyers. *Gaudeamus iigtur.*

Such gas-legislation run crazy, such as we have seen so much of at this session, bids fair to bring down a storm of disgust from all who have any appreciation of the subject; and it may be therefore that the masterly inactivity of the Companies is just now their real policy. We, however, are not in *their* counsels.

THE WEST BLOOMFIELD GAS WELL.

The Editor of this Journal feels entitled to claim that his name shall be associated with the development of a source of wealth and comfort, which is to play a great part in the future history of large districts of the United States. This claim is founded on his priority in pointing out that an immense area of our country is underlaid by rocks, highly saturated and impregnated with fossil marsh-gas, pent up under enormous pressure; constituting a stupendous reservoir of heat, light, power, and energy, which requires but tapping at almost any point, to yield up its treasures without limit or stint.

This being so, he feels it his right, as well as his duty, to protest against the preposterous attempts that have been made to overrate and to misuse, for purposes of stock-jobbing and speculation, this new and great resource put before us by Mother Nature. In the note placed first before the readers of this Journal, in the issue of March 16th, 1870, (published also in *Silliman's Journal*) on the great gas-well at West Bloomfield, in Ontario County, New York; it was clearly stated by the present writer, that the gas, loaded, as it is, in its native state, with some ten per cent. of carbonic acid, had not certainly more than seven candle-power. The probability was pointed out in another place, however, that if this carbonic acid could be removed, the gas might have from twelve to fourteen candle-power. Why is it, that, in the face of these actual and positive results (as will be seen from an account in another column) this impure gas has absolutely been conducted twenty miles, to Rochester, and turned into the mains of the Gas Light Company of that city, apparently without any attempt at purification or enrichment?

The Editor of this Journal, in view of these facts, and of the further fact that numerous inquiries are addressed to him on this subject, couched in such terms as to imply an amount of responsibility, which he denies with indignation; desires to say that, since the rendition of the statement above referred to, in the columns of this Journal, he has had no direct information, communication or intercourse, from or with, the parties interested in this gas well; and knows nothing, except from public and newspaper report, of their plans, proceedings or prospects.

THE AMERICAN HYDROCARBON PROCESS.

As promised in our last, we have procured some facts relating to the Newburgh Works, which will be found incorporated in a letter with which we have been favored, from Mr. H. P. Allen, President of the "National Coal Gas Company," the Company which owns the patents, by authority of which these improvements have been introduced.

The statements of Mr. Allen, however, require much supplementing; and it is our purpose to begin, in the next issue of this Journal, to put before the fraternity, the *details* of the great series of experiments that have been made, and which have brought this process up to its present established position.

Facts and Figures are what the Fraternity demand; and Mr. Allen has put us in the way of furnishing these in ample measure.

PATENT PIPE JOINT.

The attention of our readers is directed to an illustration on first page of a patented pipe-joint, the invention of Messrs. S. Trumbore and B. E. Lehman of Bethlehem, Pa. The frequent pulling apart and leakage of water pipes has been a source of great trouble and annoyance; this improvement seems to meet the requirements so much needed, and in the words of the patentee "it becomes impossible from any cause whatever, to pull apart and cause leakage." They offer to make liberal arrangements with any party for the purpose of introducing their improvement.

ERRORS IN THE LAST ISSUE.

In Excerpt No. 198, on the "Relations of Calorific Power of Combustibles to Composition," one word was omitted, and, as *will* at times occur, this very word was a strictly essential one. "During the last sessions of the New York Lyceum of Natural History, should have read *During the last spring sessions, etc.*: (the implication of *date* varying but *one year.*)

The first item on page 86, also, was inserted without the knowledge of the Editor, and therefore without his revision. It is clear that the explosive compound formed from the gas, on the interior of the copper tube, was *acetylide*, not *acetate* of copper (which latter statement, going the rounds now of our technical journals, and which has gained admittance even into the *Scientific American*), is simply absurd. This explosive compound was first discovered, long before *acetylene* was identified, by Dr. John Torrey, of New York. If he had followed up his observations, he would have been rewarded by the discovery of one of the most important compounds known to chemists. It will be appropriate, in this connection, to repeat here, a note appended to a former report of the present writer, published about eight years since.

"The first chemist who observed the explosive compounds formed by the combination of the acetylene, which always occur in traces in ordinary gas, with he internal surface of copper tubes, was, so far as I can ascertain, Dr. John Torrey, of New York, the observation having been made as early as 1839. Acetylene was then, of course, unknown, but Dr. Torrey, on first reading the accounts of Boettger's discovery of the explosive compound precipitated from alkaline solutions of cuprous oxyd by coal gas (Dingler's polyt. Jour. 52, 22) afterwards found by Berthelot to be a compound of acetylene with the cuprous oxyd, recalled his previous investigations and published an interesting note on the subject, in the AMERICAN GAS-LIGHT JOURNAL, of September 1st, 1859. I clearly remember being informed of these facts myself, by Dr. Torrey, in the year 1849, and he at the same time stated to me that he believed, from his experiments on the explosive material, that it was a very unstable compound of some unknown hydrocarbon with the copper, a hypothesis since remarkably verified.—H. W."

THE SYNOPSIS OF BRITISH GAS LIGHTING.

We are authorized by Mr. Smedberg to state to the subscribers of the above work, that so soon as the required number is obtained (400) the work will be placed in the hands of the printer, of which due notice will be given.

THE MANUFACTURER AND BUILDER.—This scientific monthly began the new year with a very good number. As a presage of its future excellence, it appeared in a new and tasteful dress, which cannot fail to be appreciated by all. We are pleased to notice the continued success of this useful magazine, and recommend the attention of our readers to a perusal of its pages, as it always contains valuable and interesting matter relating to science and art. Published by the Engineers' and Manufacturers' Publishing Company, 37 Park Row, New York. $2 a year.

☞ REMOVAL.—Bird, Perkins & Job, commission merchants and ship brokers, importers of American, Foreign, and Provincial coal, have removed their offices to 27 South st., New York, and 103 State st., Boston, Mass.

FILE FOR NEWSPAPERS, ETC.

SUBSCRIBERS DESIRING TO PRESERVE THE AMERICAN GAS-LIGHT JOURNAL AND CHEMICAL REPERTORY, can procure a very neat and desirable File or Cover at this Office. Price $1, postage prepaid.

Prof. Henry Wurtz,

Scientific and Practical Chemist and Geologist.

26 PINE STREET, ROOM 36, NEW YORK.
(Office Hours 1 to 4 daily, except Saturdays.)

Geological Explorations and Reports—Chemical Analyses—Advice and Investigations in all the Chemical Arts—Chemical Inventions and Improvements made.

[Prof. W. makes a specialty of GAS CHEMISTRY, and the Analysis of Gas and Coals. Formerly Chemical Examiner in the U. S. Patent Office Practices as

Patent Agent, Counsel and Adviser

of INVENTORS, in all the CHEMICAL ARTS; for which his great general experience in these Arts, and his special experience inside the Patent Office, have qualified him to an unparalleled degree.

Prof. WURTZ is Editor of the AMERICAN GAS-LIGHT JOURNAL AND CHEMICAL REPERTORY, a journal whose circulation and patronage is among classes of the community of the highest position, influence and enterprise; and which furnishes therefore an unequalled medium for communication to the general public of valuable inventions and novel enterprises.

For procuring British and other Foreign Patents promptly, and on moderate terms, Prof. W.'s arrangements are unusually complete and perfect. Inventors may assure themselves of the most *competent, diligent* and *faithful* attention to their interests.

PATENT OAK AND RATTAN GAS SCREEN.

It is five years since these Screens, made of Oak and Rattan, for purifying coal gas, were first introduced, and a thorough trial of them made. Up to this time they are used in many of the largest gas works in this country, with the highest approval over all other Screens.

They are so simple in construction and the material used so adapted to the use they are put too, that it is certain no other way of making a gas screen can ever compete with this. Oak is used for the frames, and put together by a round tenant and mortise, using steam-bent oak for fitting around pipes; after which, rattan is interlaced when wet, thus holding the frame firmly together, and *dispensing with all pins or nails*, which are liable to drop or rust out, and in this manner we produce a *light, strong* and *durable* screen with uniform perforations, that will always remain in place, which is not the case with slat trays. They also give a purifying surface of over *one hundred per cent. more* than any other screen, greatly lessening the pressure on the retorts.

A. M. GILES, of the Boston Gas Works says under date 26th January, 1872:

I have used them exclusive of all others for three years past. The purifying surface I find to be nearly *three times that of any other tray*, and their durability has been perfectly satisfactory.

H. A. Allyn. of Brooklyn Gas Works, says:

I have had them in constant use for over two years, and consider them superior to any gas tray made in this country.

Col. J. H. ARMINGTON, Superintendent of Providence (R. I.) Gas Works, after trial of these screens in all his purifiers, says:

The amount of gas purified per bushel of lime (slacked) is six thousand five hundred and fifty-six cubic feet.

GEORGE DWIGHT, of Springfield Gas Works, says, under date March 5th, 1872:

Your screens we have had in use *two years*. They give good satisfaction and wear well.

J. M. COX, of New Haven Gas Works, says, under date 4th March, 1872:

I have used iron and wood screens of different forms, and *none I have ever seen are equal to yours*, as the gas passes through them under much *less pressure*, and they *purify more gas per bushel of lime.*

We will send a sample screen to any company ordering it, delivering same free to any Express Company in Boston.

We might give quotations from many letters. We give a list of some Gas-Light Companies using them.

Providence, R. I., Gas-Light Co.; Boston, Mass., Gas-Light Co.; East Boston, Mass., Gas-Light Co.; South Boston, Mass., Gas-Light Co.; Springfield, Mass., Gas-Light Co.; New Bedford, Mass., Gas-Light Co.; Manchester, N. H., Gas-Light Co.; Reading, Penn., Gas-Light Co.; Biddeford, Me., Gas-Light Co.; Hartford, Conn., Gas-Light Co.; New Haven. Conn., Gas-Light Co.; New Orleans, La., Gas-Light Co.; Savannah, Ga., Gas-Light Co.; Charleston, S. C., Gas-Light Co.; Trenton, N. J., Gas-Light Co.; Charlestown, Mass., Gas-Light Co.; Dorchester, Mass., Gas-Light Co.; Chelsea, Mass., Gas-Light Co.; Baltimore, Md., Gas-Light Co.; Manhattan, N. Y., Gas-Light Co.; Cincinnati, Ohio, Gas-Light Co.; San Francisco, Cal., Gas-Light Co.; Albany, N. Y., Gas-Light Co.; Sacramento, Cal.; St. Joseph, Mo., Gas-Light Co.; Leavenworth, Kansas, Gas-Light Co.; Macon, Ga., Gas-Light Co.; Roxbury, Mass., Gas-Light Co.; Lansingburgh, N. Y., Gas-Light Co.; Bridgeport, Conn., Gas-Light Co.; Stamford, Conn.; Gas-Light Co.; Poughkeepsie, N. Y., Gas-Light Co.; Scranton. Penn., Gas-Light Co.; Lewiston, Me., Gas-Light Co., and one hundred others.

Address GEO. W. DAY, Treas.,
293 Amer. Gas Screen Man'f'g Co., Haverhill, Mass.

GAS WORKS WANTED.

WILL PURCHASE GAS WORKS (COMPLETE OR INCOMPLETE) in a live town of from 5,000 to 25,000 inhabitants. Must buy low for cash, or rent on favorable terms. Answer immediately, giving capacity of Works, length and size of street mains, number of consumers, population, and full particulars. Address GAS WORKS CONTRACTOR, office of this Journal. 294-2t

JOHN H. EICHHOLZ,

Practical Gas Engineer

AND BUILDER OF

NAPHTHA & COAL GAS WORKS.

Has built and put in successful operation Naphtha Gas Works at the following places, to which he refers: Saratoga, New York; Memphis, Tenn.; Hamilton, Ohio; Columbus, Ohio.

Estimates furnished for cost of Works, and cost of manufacturing.

Address J. H. EICHHOLZ, Saratoga Springs, New York, P. O. Box 281. 253-unl

JOHN McNEAL & SONS,

MANUFACTURERS OF

Cast Iron Gas and Water Pipe.

Works—Burlington, N. J.
Office—117 Broadway, N. Y.

Having withdrawn from the firm of R. D. WOOD & Co., the practical management of which we have had since the organization of that firm until June 1871, we have now completed our Works for the manufacture of CAST IRON PIPE and Castings generally.

Having immediate rail and water communication with New York and Philadelphia, as well as the coal and iron regions, we have every advantage of situation.

Our experience in the manufacture of Pipe for a great many years, has enabled us in rebuilding to practically apply Machinery and Fixtures of the very best character, to insure *good work.*

We are now prepared to contract for this class of Castings under the most favorable terms.

We have associated with us Mr. H. G. H. TARR, formerly with R. D. WOOD & Co., who will take charge of our sales department in New York. 262-1y

GLOUCESTER IRON WORKS.

GLOUCESTER CITY, NEW JERSEY.

DAVID S. BROWN, Pres't. JAMES P. MICHELLON, Sec'y.
BENJ. CHEW, Treas. WILLIAM SEXTON, Sup't.

OFFICE, PHILADELPHIA,
No. 6 North Seventh St., (west side.)

CAST IRON GAS AND WATER PIPE

PIPE CAST VERTICAL.

1½ to 48 inches diameter.

Cast Iron Flange Heating and Steam Pipe.

STOP VALVES FOR WATER OR GAS, ALL SIZES.

Fire Hydrants, GAS HOLDERS,

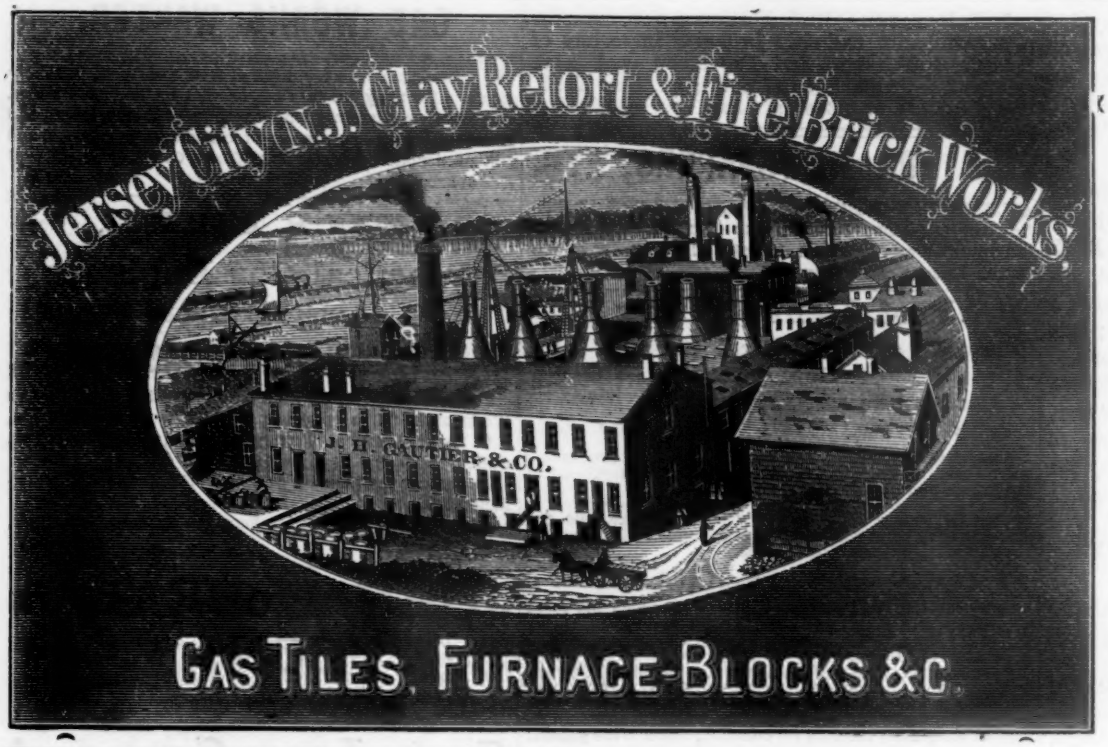
TELESCOPIC OR SINGLE.

☞ Castings and Wrought Iron Work of all kinds for Gas Works. 253-6m

Curley's Improved Retort Setting and Independent Damper.

Prevents the sudden Chilling Contraction, and early Destruction of the Retorts; more than doubles their durability and maintains a high uniform heat.

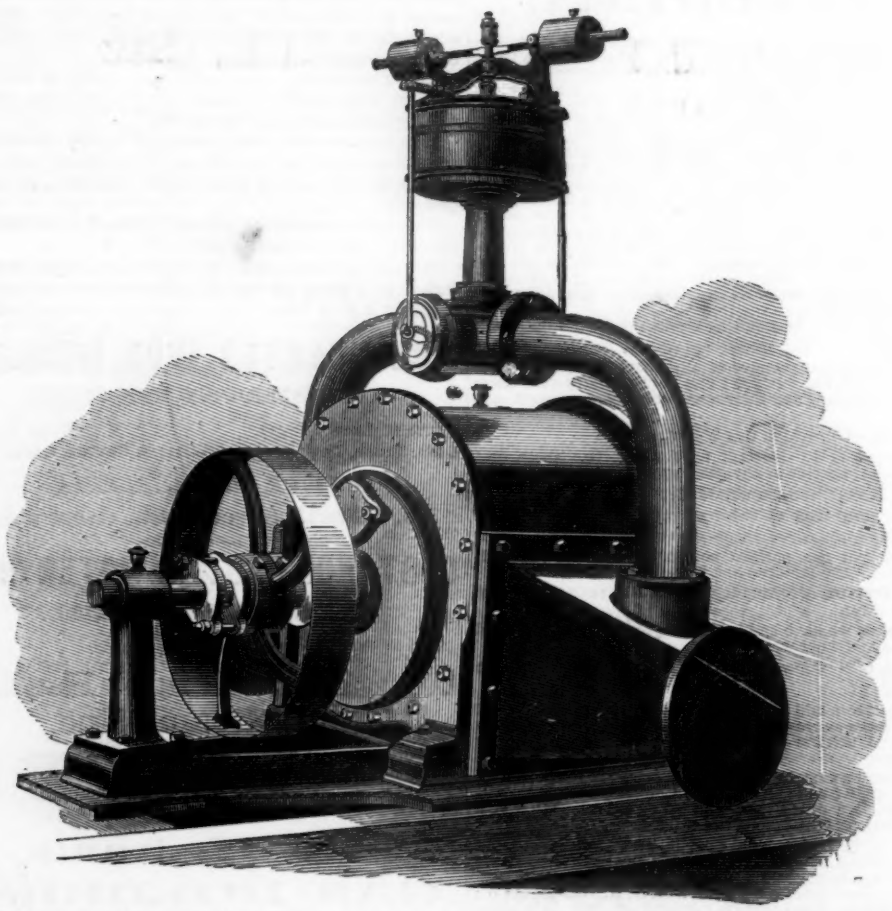
For particulars address THOMAS CURLEY, Wilmington Del., or C. E. Sanderson, 42 Pine street N. Y., Room 18. 258-tf



SMITH & SAYRE MANUFACTURING COMPANY.

The Mackenzie Patent Gas Exhauster

And Patent Compensator.



They are made to pass from 4,000 to 150,000 cubic feet of gas per hour; will increase the production and illuminating power of the gas, and add very much to the durability of the retorts, either clay or iron. The Compensator obviates entirely the necessity of water-joints, is compact, durable, cleanly, not liable to get out of order, self-acting, quiet, and certain in its operation.

We are also sole proprietors and manufacturers of the

MACKENZIE PATENT BLOWER, PATENT CUPOLA AND SMELTING FURNACE.

The Blower is a Force Blast machine, durably built, and can be driven with one-third the power required to drive the ordinary Fan. The Cupolas are manufactured in sizes to melt from 1 to 20 tons per hour, will save one quarter of the time required by the old style Cupola, and 33 per cent fuel. Address

CHARLES W. ISBELL, Secretary. JAMES SAYRE, Treasurer, G. G. PORTER, President.

OFFICE, 95 LIBERTY STREET, New York.

GRAHAM'S

Patent Anti-Freezing LAMP POST.

THE BEST, CHEAPEST AND MOST DURABLE POST EVER OFFERED TO THE PUBLIC.

WOOSTER, OHIO
Jan. 24, 1871.

J. W. GRAHAM,

Dear Sir: Yours of the 14th inst at hand. In reply I would say that we have tested the six anti-freezing Lamp Posts purchased from you, and find them to be all as you represented. Whilst nearly a dozen of our sixty-five Posts were frozen down last month and first of this not one of yours was affected by the heavy frost. What can you sell them at?

Yours truly,
LUCAS FLATTERY
Sec'y Wooster Gas-Light Co.

Address the Patentee,
J. W. GRAHAM,
Chillicothe, Ohio.

250-9t

AGENCY FOR

GIBSON'S IMPROVEMENT

IN THE

Manufacture of Coal Gas,

41 PINE STREET, ROOM 1.

The undersigned having been appointed Special Agent for the introduction of GIBSON'S Substitute for Dip-Pipes in the Manufacture of Coal Gas, respectfully presents for the consideration of Gas-Light Companies the Circulars and Pamphlet issued by the American Coal Gas-Light Imp. Co., descriptive of the value of GIBSON'S Improvement, and the mode by which Gas-Light Companies can satisfy themselves of its usefulness, without trouble or expense, at their own works.

Orders for fitting up Valves of any desired form or patent, *subject to the generality of the Gibson claim*, and also for SUPPLIES and MATERIALS of every description required for the use of Gas Light Companies promptly attended to by

W. H. GRENELLE, Special Agent.

REFERENCE.—RICHARD MERRIFIELD, Esq., late Vice President MANHATTAN GAS-LIGHT COMPANY.

WORKS UPON GAS.

BOWDITCH.—THE ANALYSIS, TECHNICAL VALUATION, Purification, and Use of Coal Gas, with illustrations, 8vo. cloth. Price, $4.50.

THE GAS MANAGER'S HAND BOOK; consisting of Tables, Rules, and Useful Information for Gas Engineers, Managers, and others engaged in the Manufacture and Distribution of Coal Gas. By Thomas Newbigging; 8vo. cloth. $3.75.

BOWER—Gas Engineer's Book of Reference, illustrated, 4to. Price, 75c.

CLEGG—Treatise on the Manufacture of Coal Gas, 5th edition, enlarged, 4to, cloth. Price, $10.50.

COLBURN—The Gas Works of London, 12mo, boards. Price, 60 cents.

GAS CONSUMERS' GUIDE—A Hand Book of Instruction on the proper management and economical use of gas, etc., etc. 12mo., cloth. Price, $1.00.

HUGHES—Gas Works and Manufacturing Coal Gas, 12mo. Price, $1.20.

MASON—The Gasfitter's Guide, paper. Price, 50 cents.

D'HURCOURT—De l'Eclairage du Gas. Par E. R. Hurcourt, 3d edition. Paris, 1863; 8vo. and plates, $6.00.

RICHARD—Gas Consumer's Guide, 12mo. Price, 50 cents.

SWEET—Special Report on Coal, showing its Distribution, Classification, and Cost, delivered over different routes to various points in the State of New York, and the principal cities on the Atlantic Coast. By S. H. Sweet, with Geological Maps. 1 vol. 8vo. cloth, $3.

SUGG—Gas Manipulation, with a description of the various Instruments and Apparatus employed in the Analysis of Coal and Coal Gas, 8vo., cloth. *Scarce.*

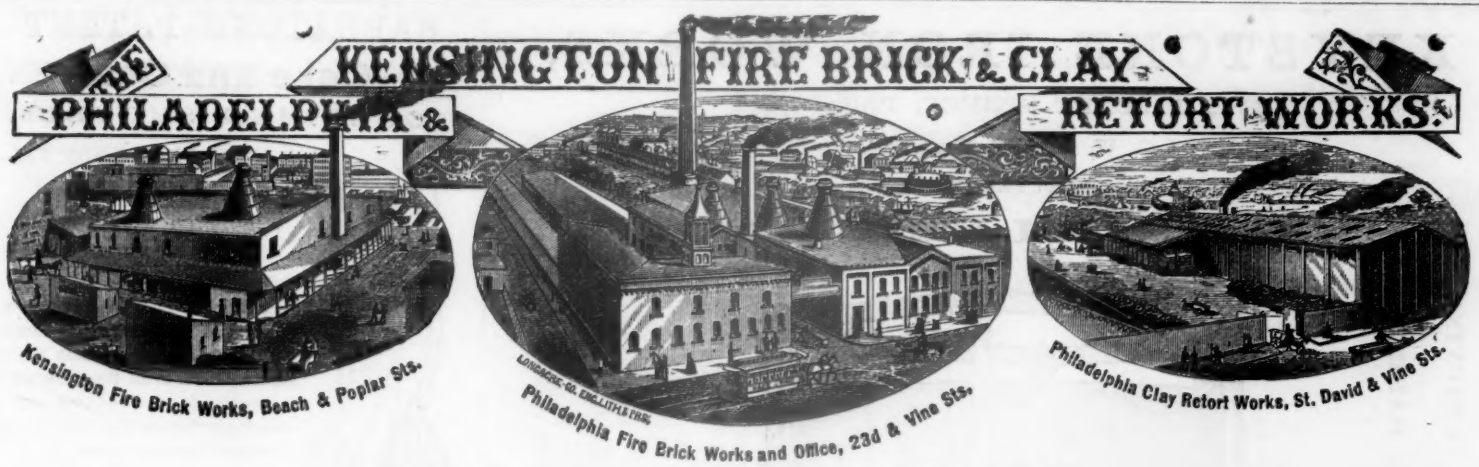
WILKINS—How to Manage Gas; 24mo., paper. Price, 25c.

SCHILLING—Traite d'Eclairage par le Gaz. Price, $22.

For sale by

D. VAN NOSTRAND, Publisher,
23 Murray Street and 27 Warren Street
(Upstairs).

☞ Our new and revised Catalogue of American and Foreign Scientific Books, 80 p. 8vo., sent to any address, on receipt of ten cents in postage stamps. 239


THE PHILADELPHIA &
KENSINGTON FIRE BRICK & CLAY
RETORT WORKS.
Kensington Fire Brick Works, Beach & Poplar Sts.
Philadelphia Fire Brick Works and Office, 23d & Vine Sts.
Philadelphia Clay Retort Works, St. David & Vine Sts.

PHILIP NEUKUMET,

(SUCCESSOR TO JOHN NEUKUMET),

Manufacturer of Fire Bricks, Tiles, Gas and Sugar House Retorts.

☞ Plans of Settings for Benches of Threes, Fives, and Sixes furnished, free of charge, upon application.

WILSON & GARDNER.

Works, Lockport, Westmoreland Co., Pa.

Office, 96½ Fourth Avenue, Pittsburgh, Pa., Rooms 1 and 2.

MANUFACTURERS OF

CLAY RETORTS, FIRE BRICK, TILE, Etc.

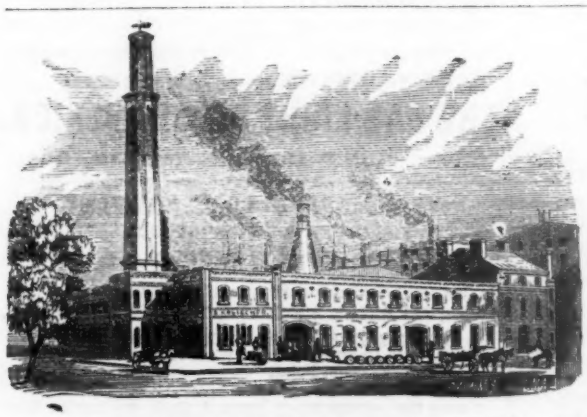
FROM CLAY, SAME SPECIES, AND EQUAL TO

BEST BELGIAN.

☞ ORDERS PROMPTLY FILLED. IMPROVED WORKING PLANS OF THREES AND FIVES UPON APPLICATION.

REFERENCES:

Gas Works Northwest, West, and South.



NEW YORK
FIRE BRICK AND CLAY

Retort Works.

☞ *Established in* 1845. ☜

(Branch works at Kreischerville, Staten Island.)

B. KREISCHER & SON,

OFFICE,

58 Goerck Street, cor. Delancy, N. Y.

GAS RETORTS, TILES & FIRE BRICK
Of all shapes and sizes.

FIRE MORTAR, CLAY AND SAND.

Articles of every description made to order at the shortest notice.

B. KREISCHER & SON.

MANHATTAN
FIRE BRICK & ENAMELLED CLAY

Retort Works,

MAURER & WEBER,

(Of the late firm of B. Kreischer & Co.,)

PROPRIETORS.

Office and Works, 15th Street, Avenue C.

Manufactures of

FIRE BRICK AND LILES,

Of all shapes and sizes.

FIRE MORTAR, CLAY AND SAND.

☞ Articles of every description made to order at short notice. (135

HY. MAURER. ADAM WEBER.

GRAHAMITE,

OR

RITCHIE MINERAL.

The yield of this Asphalt is nearly double, and the Candle Power more than double the product of Gas Coals, and it is extensively used by great and small companies, chiefly as an enricher and stimulant, in the proportion of five per cent. Yield 15,000 to 16,000 feet per gross ton. Illuminating power 30 to 32 candles. One bushel of lime purifies 6000 feet. Coke very strong. It is incapable of spontaneous combustion or caking in the heap, and is used by simple addition to the charge.

We sell at figures which allow a much larger profit to the purchaser, with better light than any standard coal.

No gas material is at once so safe and so cheap. Our Asphalt is used in the manufacture of Varnish, Roofing, Ship Paint, Tiles, Pavements, Water Proof Paper, Cloth, and for all purposes where a coating is required that is unaffected by Water, Gasses, Alkalies, or Acids.

The Ritchie Mineral Resin and Oil Co.

958-3m No 27 South Charles St., Baltimore, Md.

OHIO GAS CANNEL,

From the Sterling Colliery.

I am now prepared to place in the market, through my agencies as below, a regular and unlimited supply of this valuable Cannel, for gas purposes. A recent analysis, by Prof. WURTZ, Editor of this Journal, at the Laboratories of the NEW YORK GAS-LIGHT COMPANY, gave 47⅛ per cent of Volatile Matter and 45 bushels to the ton of a fair quality of coke. The yield of gas was at the rate of 9,500 feet per ton of about 27 candle power. It is not highly sulphurous, can be purified by Lime, and the ash from the coke does not clinker.

GEORGE R. TUTTLE, Proprietor,
Cleveland, Ohio.

GENERAL AGENCIES.

George Merryweather, 5½ Pine Street, N. Y.
J. S. Putnam, Albany, N. Y. 959

LACLEDE FIRE BRICK
AND

Clay Retort Works,

Cheltenham, St. Louis Co., Mo.

Laclede Fire Brick Manufacturing Co.

Office, 901 Pine Street. Warehouse, 1007 N. Levee, St. Louis

NOW READY AND FOR SALE,

FODELL'S

System of Bookkeeping

FOR GAS COMPANIES.

Price $5, which should be sent either in Check, P. O. Order, or Registered Letter.

Blank Books, with printed headings and forms on this system, will be supplied to Gas Companies, by applying to W. P. FODELL, Philadelphia, or

A. M. CALLENDER & CO.,
Office GAS-LIGHT JOURNAL, 42 Pine St., N.Y.

KEYSTONE IRON WORKS,

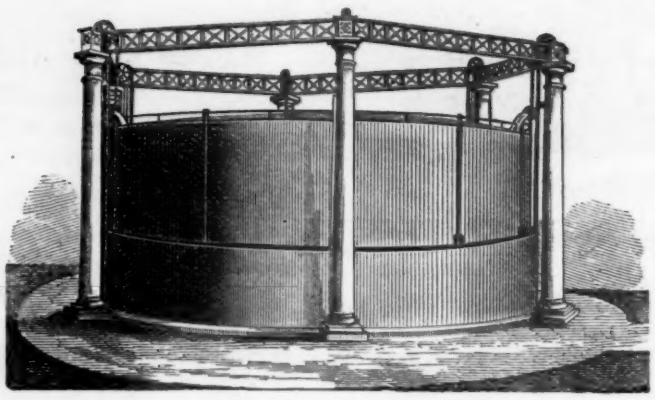
2132 FILBERT STREET, Philadelphia,

G. W. KRAFT, Proprietor,

MANUFACTURES

GASOMETERS.

COAL CARS, PURIFYING BOXES, COKE BARROWS.



RETORT HOUSE ROOFS, WATER TANKS.

Wrought Iron Work for Bridges, Buildings, Steam Boilers, Tanks, Stills, &c.

Particular Attention paid to Alterations and Repairs.

PROVIDENCE

Steam & Gas Pipe Co.,

PROVIDENCE, R. I.,

BUILDERS OF

Coal and Rosin Gas Works,

FOR TOWNS AND MANUFACTORIES.

Estimates furnished of the cost of Works, and cost to Manufacture Gas in any Locality.

Gasholders,

Iron Truss Retort House Roofs,

Water Tanks,

Purifier Covers,

Coke Barrows,

Cast Iron Socket Pipe.

Particular attention given to Enlarging and Re-building Gas Works.

For Lighting Manufactories, our Rosin Gas Works have been successfully used for *many years* past. They require but small outlay, and afford a *safe* and *economical* light.

FOR SALE AT MANUFACTURERS PRICES:

EXHAUSTERS AND COMPENSATORS,
IRON AND CLAY RETORTS,
FIRE BRICK, CLAY AND TILE,
ROMAN CEMENT AND ROSIN,
STATION AND CONSUMERS' METERS.

REFER TO

Manufacturers' Gas Co., Fall River, Mass.; Youngstown Ohio, Gas Co.; New Rochelle, N. Y., Gas Co.; Homer and Cortland, N. Y. Gas Co.; Danbury, Conn., Gas Co.; North Bridgewater, Mass., Gas Co.; Cold Spring, N. Y., Gas Co., Rockville, Conn., Gas Co.; Taunton, Mass., Gas Co.; Pawtucket, R. I., Gas Co.

Frederick Grinnell, President, J. C. Hartshorn, Treas, S. Millett Thompson, Secretary.

Office and Manufactory, corner of Pine and Eddy Streets, Providence, Rhode Island.

Office in Syracuse, N. Y., No. 1 Granger Block.

H. A. BRANCH, Agent.

MITCHELL, VANCE & CO.,

Manufacturers of

CHANDELIERS!

And Every Description of

GAS FIXTURES,

Also Manufacturers of

Fine Gilt, Bronze and Marble Clocks, warranted best Timekeepers, Mantle Ornaments, &c.

Salesroom, 597 BROADWAY,

(Rear Entrance 140 Mercer Street,) NEW YORK.

Special designs furnished for Gas Fixtures for Churches Public Halls, Lodges, &c.

Smith & Ellis,

IRON FOUNDRY & PIPE WORKS,

Philadelphia.

SEVERAL THOUSAND 3, 4, AND 6 INCH CAST IRON GAS PIPES OH HAND, FOR IMMEDIATE DELIVERY.

☞ GAS WORKS CASTINGS OF ALL KINDS.

291-6m

P. P. DEILY, J. FOWLER.

DEILY & FOWLER,

39 LAUREL STREET, PHILADELPHIA, PENN.,

BUILDERS OF

GAS WORKS,

MANUFACTURERS OF

GAS-HOLDERS,

WROUGHT IRON ROOFS,

CHARGING-SCOOPS, COAL WAGONS,

COKE BARROWS, AND ALL WROUGHT

WORK CONNECTED WITH GAS-WORKS.

Particular attention paid to the Extension of Works and Repairs to Gasholders, Purifiers, Etc.; also, Builders of Water Tanks, Oil Stills, Etc.

REFER TO

M. H. Jones, Easton Gas Co., Penn.
Franklin Woolman, Burlington Gas Co., N. J.
O. W. Goodwin, Camden Gas Co., N. J.
Benjamin Acton, Salem Gas Co., N. J.
D. H. Smith, Watkins Gas Co., Watkins, N. Y.
W. F. Warner, Oswego Gas Co., N. Y.
E. Wilcox, Joliet Gas Co., Ill.
Messrs. Woodbury, Walter & Potter, Kalamazoo Gas Co., Michigan.
H. H. Fish, Utica Gas Co., N. Y.
W. J. Ball, Terre Haute, Indiana.

(TO BE PUBLISHED SHORTLY.)

"A SYNOPSIS OF BRITISH GAS-LIGHTING,"

900 *pages, large 4to, profusely illustrated.*

This is the only compend of Gas-Lighting ever projected, and will be the standard work of reference among Companies, Manufactures, Engineers, Patentees, and Scientific Men generally.

Price $15, payable on delivery.

It will be sold only by subscription, which should be addressed to the compiler, JAMES R. SMEDBERG, Consulting Engineer S. F. Gas Co., San Francisco, Cal., or Editors American Gas-Light Journal, No. 42 Pine street, N. Y.

SABBATON'S PATENT Coke and Coal SCREENING SHOVELS.

MADE FROM BEST MALLEABLE IRON.

FURNISHED WITH LONG OR D HANDLES.

Perfect in their operation. Very strong, and from their great durability vastly more economical than any substitute. Refer to all the principal Gas Companies in the country, who acknowledge them as the "ne plus ultra" of Coke Screening Shovels.

Orders addressed only to

O. R. BUTLER,

Sole Agent,

No. 96 Maiden Lane, N. Y.

OFFICE OF

THE GAS-LIGHT CO. OF AMERICA

C. K. GARRISON, President.
E. W. McGINNIS, Secretary and Treasurer.
JOHN P. KENNEDY, Chief Engineer.
LEONARD D. GALE, Consulting Chemist.

Gentlemen: We beg leave to inform you, that we have purchased the Patent process for making ILLUMINATING GAS from PETROLEUM and its products, known as the

GALE and Rand Patents,

and we are now prepared to treat with you for the use of said process by your Company.

We are also prepared to contract for putting said process into successful operation in your works, furnishing all the necessary plans, materials, and workmen for that purpose.

We do not deem it necessary to enter upon a detailed description, here, of the processes above referred to, deeming it sufficient to state, to secure your interest and investigation, that they have been in successful operation, for months, in a number of Gas-Light Works in the United States, and are now being introduced in the works of the Mutual Gas-Light Company, of New York City; the Citizens' Gas-Light Company, of Brooklyn; the New Orleans, San Francisco, and very many other Gas-Light Companies throughout the country.

For full particulars, address

THE GAS-LIGHT CO. OF AMERICA.

248-tf] **P. O. Box 5220, New York City.**

THE DESPARD COAL COMPANY

OFFER THEIR SUPERIOR

DESPARD COAL

To Gas Light Companies throughout the country.
Agents, PARMELEE BROTHERS, No. 32 Pine street, N. Y.

BANGS & HORTON, No. 31 Duane street, Boston.
Mines in Harrison County, West Virginia.
Wharves Locust Point, } Baltimore.
Company's Office, 29 South street, }

Among the consumers of Despard Coal, we name: Manhattan Gas Light Company, New York; Metropolitan Gas Light Company, New York; Jersey City Gas Light Company, N. J.; Washington Gas Light Company; Portland Gas Light Company, Maine.

*** Reference to them is requested 204-1y

JOURNAL OF THE FRANKLIN INSTITUTE.

Editor—Prof. W. H. WAHL, Ph.D.

ASSISTED BY THE COMMITTEE ON PUBLICATIONS.

This Journal, devoted to Mechanical and Physical Science Civil Engineering, and the Arts and Manufactures, published in monthly numbers of seventy-two pages each, forming two volumes per annum, illustrated with engravings and woodcuts.

The Journal is now in its forty-fifth year of publication, and has become a standard work of reference.

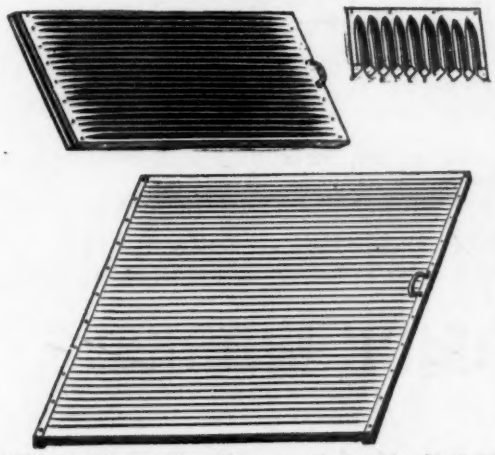
Terms of Subscription.—Five dollars per annum; payable on the issue of the sixth number. When the full subscription five dollars) is paid in advance, the numbers will be sent *free of postage*

Communications and letters on business must be directed to the Actuary of the Franklin Institute, Philadelphia

J. L. Cheesman,

MANUFACTURER OF

Patent Conically and Diamond Slotted Solid Wood Trays.



The dvantages of these Trays over those made of iron, are economy (they being over 200 per cent. cheaper than iron and will last twice as long), a greatly increased purifying surface, and a saving of time and labor in removing lime, as it does not adhere to the smooth surface of the Wood Trays, as is the case with the iron. The top cut represents the new diamond slotted or reversable Tray, a very superior improvement.

JOHN L. CHEESMAN,
151 and 153 Avenue C, New York.

CHELTENHAM

Fire Brick and Clay Retort Works.

EVENS & HOWARD,

PROPRIETORS,

MANUFACTURERS OF

FIRE BRICK,
CLAY RETORTS,
GAS HOUSE TILE,
BLAST FURNACE TILE,
CHIMNEY TOPS,
SEWERAGE PIPE from 3 to 30 inch diameter,
SUPERIOR DRY MILLED FIRE CLAY, ETC

OFFICE, 100 SOUTH ELEVENTH STREET.

241-1y **St. Louis, Mo.**

Bird, Perkins & Job,

IMPORTERS OF

Pictou,
Sydney,
Lingan,
Glace Bay,
Caledonia,
Newcastle and
Westmoreland

COAL,

ALSO,

Ince Hall and Red Bank House Cannel.

103 STATE ST., Boston. 27 SOUTH ST., N. Y. [24

NATIONAL FOUNDRY

AND PIPE WORKS.

OFFICE AND WORKS—CARROLL, PIKE, SMALLMAN AND WILKINS STREETS,

PITTSBURGH, PA.

WM. SMITH,

Manufacturer of all kinds of GAS and WATER PIPE BRANCHES, CONNECTIONS, T's, ELBOWS, and all CASTINGS USED AT GAS AND WATER WORKS,

We offer special inducements to parties wishing to purchase. My Pipe is Smooth, regular in weights, and cast vertically.

N. B.—Pipe from 3-inch and upwards, cast in 12-ft. lengths.

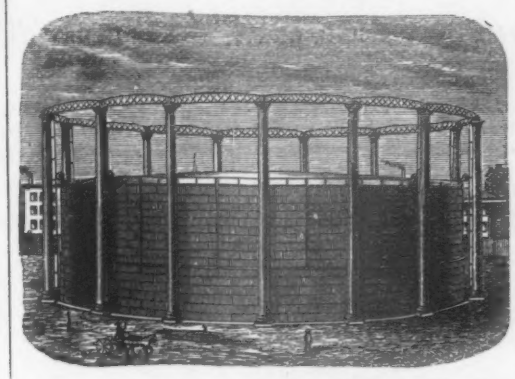
☞SEND FOR CIRCULAR AND PRICE LIST.☜

T. F. ROWLAND,

Continental Works,

GREENPOINT, BROOKLYN, N. Y.

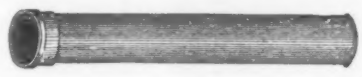
ENGINEER, AND MANUFACTURERS OF



GAS-HOLDERS

OF ANY MAGNITUDE,

Condensers, Scrubbers, Purifiers, Retorts, Hydraulic Mains, and all other articles connected with the Manufacture and Distribution of Gas, furnished with despatch. Plans and Specifications prepared, and Proposals given for the necessary Plans for Lighting Cities, Towns, Mansions, and Manufactories.



B. S. BENSON & SON,

No. 112 BROADWAY, N. Y., ROOM 1.

MANUFACTURERS OF

CAST IRON GAS & WATER PIPE,

And Fittings for Gas & Water Mains, &c.

All sizes from 3 to 30 inches, cast vertically, in lengths of 12½ feet.

SCHOOL OF MINES,

COLUMBIA COLLEGE,

EAST 49th STREET, NEW YORK.

FACULTY:

F. A. P. BARNARD, S.T.D., LL.D., President.
T. EGLESTON, Jr., E.M., Mineralogy and Metallurgy.
FRANCIS L. VINTON, E.M., Mining Engineer.
C. F. CHANDLER, Ph.D., Analytical and Applied Chemistry.
JOHN TORREY, M.D., LL.D., Botany.
CHARLES A. JOY, Ph.D., General Chemistry.
WILLIAM G. PECK, LL.D., Mechanics.
JOHN H. VAN AMRINGE, A.M., Mathematics.
OGDEN N. ROOD, A.M., Physics.
JOHN S. NEWBERRY, M.D., Geology and Palaeontology.

The plan of this School embraces a three years' course for the degree of Engineer of Mines, or Bachelor of Philosophy.

For admission, candidates for a degree must pass an examination in arithmetic, algebra, geometry and plain trigonometry. Persons not candidates for degrees are admitted without examination, and may pursue any or all of the subjects taught. For further information and for catalogue, apply to

252-1y DR. C. F. CHANDLER, Dean of the Faculty.

THE NEWBURGH

Orrel Coal Company,

Mines at Newburg, Preston County, W. Va.

Company's Office, No. 52 S. Gay Street, Baltimore, Md.

C. OLIVER O'DONNELL, Pres't. CHAS. MACKALL, Sec'y.

CHAS. W. HAYS, Agent in New York, Room 7, Trinity Building, 111 Broadway.

SINCLAIR & AGNEW, Agents, Alexandria, Va.

This Company offer their very superior Gas Coal at lowest market prices.

It yields 10,996 cubic feet of gas to the ton of 2,240 lbs. of good illuminating power, and of remarkable purity; one bushel of lime purifying 6,792 cubic feet, with a large amount of coke of good quality.

It has been for many years very extensively used by various Gas Companies in the United States, and we beg to refer to the Manhattan, Metropolitan, and New York Gas Light Companies of New York; the Brooklyn and Citizen's Gas Light Companies of Brooklyn, N. Y.; the Baltimore Gas Light Company of Baltimore, Md., and and Providence Gas Light Company, Providence, R. I.

The best dry coals shipped, and the promptest attention given to orders. 224-1y.

PLYMOUTH IRON WORKS.

MANUFACTURERS OF

Cast Iron Gas and Water Pipe,

FROM TWO INCHES TO SIX FEET DIAMETER.

HENRY G. NICHOLS,

SELLING AGENT.

14 PLATT STREET, N. Y. 291-6m

LUDLOW

Valve Manufacturing Co.

OFFICE 193 RIVER STREET, TROY, N. Y.

Make Valves—Double and Single Gate—¾ inch to 36 inch, for Water, Gas and Steam.

"CINCINNATI, March, 1870.

"I would say that if any certificate or affidavit is desired in relation to the superior character of the Ludlow Valve above others that I have seen, the same will be cheerfully given. I think, however, that the Valve proves for itself.

"JOSEPH MAYER,
"Superintendent Water Works.

"DAYTON, OHIO, June 27, 1870.

"I have to say that we find them always in order—operating easily unde all degrees of pressure. In a words they have given perfect satisfaction in every particular.

"GEORGE LEHMAN,
"Chairman Water Works Committee.'

"CANTON, OHIO, June 27, 1870.

"We are now using and have been, since the commencement of our works, your valves, and they are proving entirely satisfactory.

"JOHN S. SHORB,
"Superintendent Water Works."

"PEORIA WATER WORKS, July 1870.

"With pleasure I can testify to their superiority. Their action has been perfect under all degrees of pressure, and have given perfect satisfaction.

"S. A. KINSEY, Ex. Sup't.
"JOHN J. STEIGER, Sup't."

"BROOKLYN GAS LIGHT COMPANY.

"I take great pleasure in saying that they give perfect satisfaction—opening easily and quickly, and requiring no effort to start them; even after they have been closed for months

"A. F. HAVENS, Engineer."

"OFFICE OF PHILADELPHIA GAS WORKS, 14th June, 1870.

"I am pleased to state that the lot of large Gas Valves bought from you (Hart & Buck), as agents of the Ludlow Manufacturing Co., have given me perfect satisfaction. The double gate water valve, bought for a special purpose, also works admirably. We want no better valves. The Indicator on your valves is a great improvement over the old style.

"THOS. R. BROWN, Engineer."

On the Advantages of Gas for Cooking and Heating:

BY MAGNUS OHREN, A.I.C.E.,

Secretary of the Crystal Palace District Gas Company, Lower Sydenham, London, S.E.

NOTICES ON THE FIRST EDITION.

"This Pamphlet, which we have read carefully, is calculated to convince the most sceptical as to the saving to be effected from the use of gas for the purposes advocated by the author, whose well-known reputation as a scientific engineer stamps his opinions on the subject with a high value. In this instance, moreover, details and proof are cited which render his position impregnable, and entirely remove theories into the domain of facts."—"*The Freemason.*" *28th October*, 1871. Little Britain, London, E. C.

ALLIANCE AND DUBLIN CONSUMERS GAS CO.,
DUBLIN, 30th October, 1871.

My Dear Sir: You have brought out a first rate little book. Many thanks for sending me a copy. You have gathered a great amount of information into little space.

I am yours faithfully,
Magnus Ohren, Esq. J. SOMERVILLE.

Intended for distribution by Gas Companies to their Consumers. A copy direct from the author by post for 25 cents United States currency. Address Lower Sydenham, London, S. E. 291-unl

THE AMERICAN METER COMPANY.

Organized under the General Manufacturing Laws of the State of New-York.

SAMUEL DOWN, President. HENRY CARTWRIGHT, Vice-President. THOMAS J. EARLE, Secretary.

Trustees:

SAMUEL DOWN WILLIAM HOPPER, R. H. GRATZ, HENRY CARTWRIGHT, RICHARD MERRIFIELD.
THOMAS C. HOPPER, Superintendent at Philadelphia.

This Company is now prepared to furnish WET AND DRY GAS METERS, STATION METERS, GOVERNORS, PRESSURE INDICATORS AND REGISTERS, SERVICE and METER COCKS, and all articles in their line appertaining to the use of Gas Works.

The combination of Mechanical and Scientific Skill, and the long experience of the several members of the Company, is a sure guarantee of durability, accuracy and excellence of Workmanship. Orders addressed

AMERICAN METER COMPANY,

West Twenty-Second Street, New York. Arch and Twenty-Second Streets, Philadelphia. 321 Washington Street, Boston, will meet with prompt attention.

BALTIMORE RETORT AND FIRE BRICK WORKS.

GEO. C. HICKS & CO.

CLAY RETORTS FOR GAS WORKS AND SUGAR REFINERIES.

TILES AND BLOCKS OF ALL KINDS.

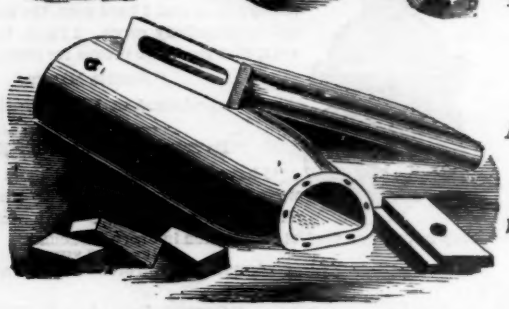
FIRE BRICK.

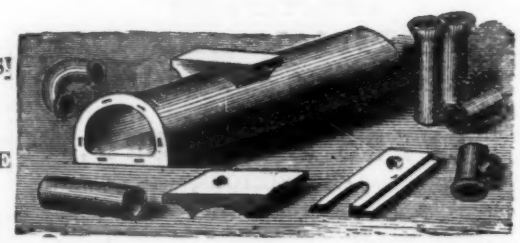
FIRE MORTAR, CLAY AND SAND.

ALL KINDS OF FIRE CLAY MATERIALS!

The Only XX Fire Brick.

☞ RETORTS OF THE VARIOUS SIZE KEPT ON HAND.





Vitrified Steam Pressed Drain and Sewer Pipe.

HARRIS & BROTHER,

ESTABLISHED 1848.

PRACTICAL GAS METER MANUFACTURERS,

Continue as heretofore at the OLD ESTABLISHMENT, Nos. 1115 and 1117 Cherry Street, Philadelphia, Pa.,

To manufacture Wet and Dry Gas Meters, Station Meters, Experimental Meters, Meter Provers, Centre Seals, Governors, Pressure Registers, Indicators, Photometers, and all kinds of Gas Apparatus; Also furnish all other Articles appertaining to the use of Gas Works.

From our long Practical Experience of the Business (covering a period of 20 years) and from our personal supervision of all Work, we can guarantee all orders to be executed promptly, and in every respect satisfactorily.

J. Wesley Harris, Washington Harris, Wm. Wallace Goodwin.

GAS PURIFICATION.

St. John and Cartwright's

NEW IRON COMPOSITION

Has purified, per bushel, on a single test, 10,000 feet of Westmoreland Gas. With revivification lasts indefinitely. Surpasses in POWER and ECONOMY all known materials. Saves largely in FIRST COST, SPACE, LABOR, SUPERINTENDENCE, and all current expenses. Will purify *easily* sulphurous gas, wholly *unmanageable by lime.* Takes out *all the ammonia.* Now operating in the following Gas Works: Harlem; New York (21st street); Port Morris; Hunter's Point; East New York; Worcester, Lynn and Cambridge, Mass.; Lewiston, Maine; St, Albans, Vt.; Pawtucket, R. I.; Meriden, Ct., and being introduced in many other places.

Cost 70 cents per bushel. One bushel for each square foot of Purifier sufficient. Rights to use for life of Patents, for daily makes of gas in thousands; under 25,000 $200; under 50,000, $400; under 100,000, $500; $250 additional for each additional 50,000 per day.

For further information and instructions, apply to
ST. JOHN & CARTWRIGHT,
21st Street and Avenue A, New York Gas Works.

☞ Immediate arrangements are urged, as the demand for he prepared composition is increasing *so rapidly* that delays supply may occur.

C. GEFRORER,

Manufacturer of

GAS BURNERS,

GAS HEATING AND COOKING APPARATUS,

FITTERS' PROVING APPARATUS. ETC.,

No. 248 North Eighth Street, Philadelphia.

RILEY A. BRICK & CO.,

MANUFACTURERS OF

CAST IRON PIPES,

FOR WATER AND GAS,

ALSO,

GAS WORKS & MACHINERY CASTINGS

OF EVERY DELCRIPTION,

No. 89 White Street, New York.

Riley A. Brick. Jas L. Robertson.

B. S. BENSON,

MANUFACTURER OF

Cast Iron Pipes and Fittings,

AND

GAS AND WATER MAINS.

All sizes from 3 to 30 inch cast vertically in 12½ feet lengths

Office & Factory 52 East Monument St.,

BALTIMORE, MD.

The Aubin Balanced

VALVE WATER METER.

(Used also for Oils and Liquors.)

Is now in use by many city water companies, because of its Low Price, Simplicity, Durability, Accuracy under any pressure, and, (a great advantage) because it runs with less head than any other meter used.

Manufactured H. Q. HAWLEY, Albany, N. Y.

R. D. WOOD & CO.,

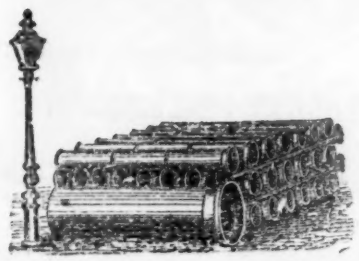
PHILADELPHIA.

MANUFACTURERS OF

CAST IRON GAS & WATER PIPES,

Matthews Patent Hydrants,

Lamp Posts, Etc.



For the accommodation of parties who may want small lots Pipe for *immediate* delivery, we have established a yard in New York City.

We have on hand here several thousand feet of small Pipe from which we can ship orders readily to any part of the country.

R. PAINE, Selling Agent,

No. 173 Broadway, New York,

3-tf SECOND FLOOR.

BLANCHARD & ARNOLD,

Excelsior Car Wheel Works,

Cor. Fourth and Fowler Sts., Milwaukee.

MANUFACTURERS OF

Gas Apparatus,

Bench Castings,

Air and Immersed Tubular Condensers,

Improved Dry Scrubbers,

Purifiers with Imp'd Dry Centre Valves,

and every description of apparatus necessary for large or small Gas Works.

The designs for our apparatus are furnished by JAMES H. WALKER, Engineer and Superintendent Milwaukee Gas Works, who can be consulted on all matters relating to the working, erection of new, or extension of old works.

Parties employing us will find their orders promptly attended to, and satisfaction guaranteed in all cases.

The best references given on these points. 244-6m

S. FULTON & CO.,

PLYMOUTH IRON WORKS,

CONSHOCKEN, PA.,

Manufacturers of

PIG IRON & CAST IRON GAS & WATER PIPES.

Also, Heay and Light Castings of every description.

412 Walnut street, Philadelphia, Pa.

SAMUEL FULTON, THEO. TREWENDT

AMERICAN JOURNAL OF SCIENCE & ARTS,

FOUNDED BY PROF. SILLIMAN IN 1818,

And now numbering 100 volumes, in two Series of 50 vols. each.

Editors and Proprietors: Profs. Silliman and Dana.

Associate Editors: Profs. Gray and Gibbs of Cambridge, and Newton, Johnson, Brush and Verrill of Yale.

Devoted to Chemistry, Physics, Geology, Mineralogy, Natural History, Astronomy, Meteorology, etc.

A Third Series in MONTHLY numbers, making two volumes a year of about 450 pages each, from January, 1871. Subscription price $6.00 a year, or 50 cents a number.

A few complete sets on sale of the first and second series.

Address, **SILLIMAN & DANA,** New Haven, Ct.

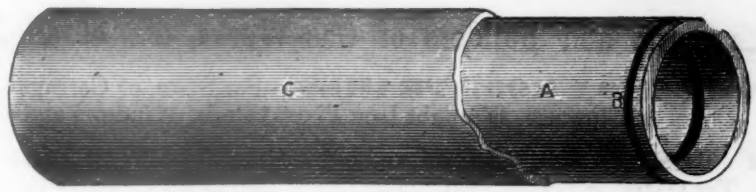
NORTHWESTERN GAS AND WATER PIPE COMPANY.

—oo—

WORKS, AT BAY CITY, MICHIGAN.

CHICAGO OFFICE, 646 WABASH AVENUE.

SECTION OF GAS PIPE.



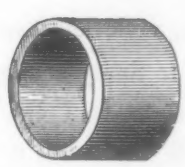


FIG. 2.

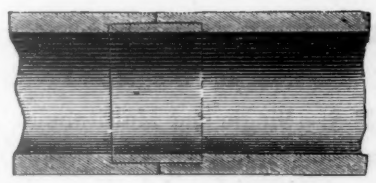


FIG. 3.

A—Cylinder of Wood. B—Band of Iron. C—Coating of Hydraulic or Asphaltum Cement.

FIG. 2.—Thimble for Connection. FIG. 3.—Horizontal Section and Connection.

Above is a cut of the

"WYCKOFF PATENT IMPERISHABLE GAS PIPE,"

manufactured by the NORTHWESTERN GAS AND WATER PIPE COMPANY.

This Pipe is made of White Pine, one inch to sixteen inches bore, in sections eight feet long, rounded in a lathe, coated inside and out with Asphaltum, connected with a tenon, or socket, and a thimble joint, perfectly air and water tight, being driven together with cement furnished by the Company. When laid its cost is about one half that of Iron Pipe, and is UNQUESTIONABLY the best Gas conducting Main in use.

☞ Send for Descriptive Pamphlet and Price List. 242-1y

DENNIS LONG & CO.,

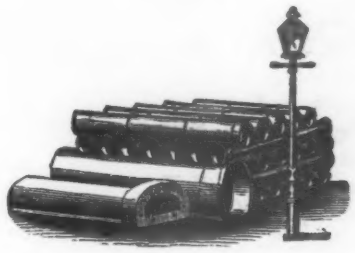
Union Pipe Works,

Louisville Pipe Foundry,

AND

Union Foundry and Machine Shops,

LOUISVILLE, KY.



MANUFACTURE

Cast Iron Gas and Water Pipe,

All Pipe cast vertically in dry sand.

2 inch Pipes in 8 feet lengths. 3 inch to 60 inch cast in 12 feet lengths.

RETORTS AND MOUTH PIECES, LAMP POSTS, CONDENSING PIPE, HYDRAULIC MAINS, PURIFIERS, DRIPS, ELBOWS, T'S, CROSSES, SLEEVES, VALVES, &c., &c.

GAS-HOLDERS.

And every description of work necessary for Gas or Water Companies.

JESSE W STARR & SONS,

Camden Iron Works

Camden, New Jersey,

MANUFACTURERS OF

ALL KINDS OF CASTINGS AND APPARATUS FOR GAS WORKS,

WROUGHT IRON ROOF FRAMES,

For Retort and other houses. Retorts and all castings required for setting them in the latest and most improved model. WASHERS, CONDENSERS, SCRUBBERS and EXHAUSTERS, for relieving the Retorts from pressure. PURIFIERS, varying from 2,000 to 2,000,000 cubic feet daily purifying capacity.

Wrought Iron Lime Sieves,

for Purifiers. Station Meters of all sizes.

GAS HOLDERS,

TELESCOPIC AND SINGLE,

With cast iron guide and suspension frames. GAS GOVERNORS or REGULATORS, STREET MAINS, from 1½ to 48 INCHES DIAMETER, for WATER or GAS. Street Main connections, such as BRANCHES, BENDS, DRIPS, SIEVES, etc.

STOP VALVES, from 3 to 30 inches, for both Water and Gas.

WROUGHT IRON WORK.

All the Smith and Sheet Iron work required in and about Gas Works. 226-tf

JESSE W. STARR. BENJ. A. STARR. BENJ. F. ARCHER.

SITUATION WANTED BY A PRACTICAL GAS ENGINEER of ten years experience in England: understands the "Elmer" process. Address ENGINEER, office of GAS-LIGHT JOURNAL. 253-unl

MORRIS, TASKER & CO.,

PASCAL IRON WORKS,

Corner Fifth and Tasker Streets, Philadelphia, and No. 15 Gold Street, New York.

Established 1821,

STEPHEN MORRIS, THOMAS T. TASKER, Jr., STEPHEN P. M. TASKER.

FOR GAS WORKS MACHINERY, ADDRESS CORNER FIFTH AND TASKER STREETS, PHILADELPHIA.

Manufacturers and Builders of Gas Works, &c., of all Descriptions, of the Most Approved Plans.

WROUGHT IRON ROOF FRAMES.—For Slate, or Corrugated Iron Coverings, with Cast Iron Cornice Gutter. Iron Doors and Frames, Wrought Iron Pivot Blinds, Windows and all kinds of Castings and Smith Work for Buildings.

BENCH CASTINGS.—Retorts, and all Castings and Wrought Iron Work required for Setting them on the Latest Plan. Tar Gates, Wrought Iron Stand Pipes, Retort Lids, Cotter Bars, Coal and Coke Wagons, and Stokers' Tools.

EXHAUSTERS.—Exhausters and Compensators, By-Passes to pass from 4,000 to 150,000 Cubic feet of Gas per hour, with Engines, Governors, Pressure and Vacuum Guages.

SCRUBBERS.—Single or Multitubular Scrubbers, with Self-Acting Pumps for Ammonia Water.

WASHERS.—Cataract and Single and Multitubular Spray Washers.

CONDENSERS.—Single and Multitubular Air and Water Condensers.

PURIFIERS.—For Purifying from 1,000 to 2,000,000 cubic feet capacity daily, with either wet or dry Lime, or Oxide of Iron, and with either Ash Rivetted or Wrought or Cast Iron Lime Sieves.

CARRIAGES.—Movable Lifting Carriages for Purifiers, arranged either for Floor or Overhead use.

METERS.—Square and Round Meters of any capacity.

GAS HOLDERS.—Single Lift and Telescopic Gasholders, with Cast or Wrought Iron Suspension Frames.

GAS GOVERNORS.—Station Governors, with Regulating and Indicating Columns for Inlet and Outlet Pipes, also Dry Governors with Flexible Diaphragms for Underground Pipes.

STOP VALVES.—Double Faced Stop Valves for Gas or Water, from three inches to forty-eight inches diameter. These Valves are proved on both sides, with a heavy Water Pressure, Flange and Bell Pipes, Fittings and Drips of all descriptions. Steam Boilers and Hot Water Apparatus for Heating Building, and Gas Holder Tanks. Lamp Posts and Lanterns.

Best quality American Charcoal Iron Boiler Tubes. Wrought Iron Tubes from one-eighth of an inch to ten inches diam., with all kinds of Fittings, Valves and Cocks, Gas and Steam Fitters' Tools, and all articles connected with the manufacture of Gas, Steam or Water.

Sole Manufacturers of P. MUNZINGER's Patent Purifiers, Dry Center Seals, Adjustable Hydraulic Main Stand, Wooden Lime Trays, Stand and Straddle Pipes, and Multitubular Water Condenser.

MR. P. MUNZINGER, Gas Engineer, has been connected with our Establishment as Engineer and Designer, and in charge of the Gas Works Department for the past fifteen years.

Plans, Specifications, and Estimates furnished, for Lighting up Towns, Cities, Factories, and Public Buildings, etc., etc., with Gas from Coal, Rosin, or Wood.

We would refer to the Gas Machinery erected by us, and in operation, at the following places:

Philadelphia, Pa.
Williamsport, Pa.
Altoona, Pa.
Willkes Barre, Pa.
Honesdale, Pa.
Harrisburgh, Pa.
Erie, Pa.
Hanover, Pa.
Easton, Pa.
Lancaster, Pa.
Lock Haven, Pa.
McKeesport, Pa.
Allentown, Pa.
Lebanon, Pa.
Uniontown, Pa.
Washington, Pa.
Hudson City, N. J.
New Brunswick, N. J.
Salem, N. J.
Newark, N. J.
Freehold, N. J.
Englewood N. J.
Jersey City, N. J.
Elizabeth, N. J.
Camden, N. J.
Flemington, N. J.

Metropolitan Works, N. Y. City.
Binghamton, N. Y.
Rome, N. Y.
Utica, N. Y.
Port Jervis, N. Y.
Elmira, N. Y.
Niagara Falls, N. Y.
Flat Bush, N. Y.
Westchester Co., N. Y.
Batavia, N. Y.
Fredonia, N. Y.
Columbus, Ohio.
Mansfield, Ohio.
People's Works, Cleveland, Ohio
Newark, Ohio.
Salem, Ohio.
Wooster, Ohio.
People's Works, Chicago, Ill.
Chicago Gas-Light and Coke Co., Ill.
Jacksonville, Ill.
Peoria, Ill.
National Asylum for Discharged Volunteer Soldiers, Milwaukee, Wis.

Detroit, Mich.
La Porte, Ind.
Lawrence, Kansas.
Salem, Oregon.
Port-au-Prince, Cal.
San Jose, Cal.
Stockton, Cal.
Illinois State Penitentiary, Joliet.
Hartford, Conn.
Hagerstown, Md.
Peoples Works, Baltimore, Md.
Elkton, Md.
Milledgeville, Ga.
Augusta, Ga.
New Orleans, La.
Shreveport, La.
Louisiana Ice Manufacturing Co.
Nashville, Tenn.
Murfreesboro, Tenn.
Jackson, Miss.
Houston, Texas.
Galveston, Texas.
And a number of others.

☞ See page 116 for Index to Advertisements.